

Railway Age Gazette

Including the Railroad Gazette and the Railway Age

PUBLISHED EVERY FRIDAY AND DAILY EIGHT TIMES IN JUNE, BY
THE RAILROAD GAZETTE (Inc.), 83 FULTON ST., NEW YORK.

CHICAGO: 417 South Dearborn St. CLEVELAND: New England Bldg.
LONDON: Queen Anne's Chambers, Westminster.

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Subscriptions, including 52 regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico.....	\$5.00
Canada	6.00
Foreign Countries (excepting daily editions).....	8.00
Single Copies	15 cents each

Shop Edition and the eight M. M. and M. C. B. Convention Daily Issues, United States and Mexico, \$1.50; Canada, \$2.00; foreign, \$3.00.

Engineering and Maintenance of Way Edition and the four Maintenance of Way Convention Daily issues, North America, \$1.00; foreign, \$2.00.

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

VOLUME 51.

SEPTEMBER 8, 1911.

NUMBER 10.

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FUEL economy is attracting a great deal of attention. The method adopted by the Erie Railroad of having supervisors of locomotive operation on each division to see that the engineers are given practical instructions in fuel economy, has given remarkable results, as shown by Mr. Randolph's paper which was presented before the Traveling Engineers' Association and is published on another page. The work was started on the Allegheny division in January, 1910, and in the first year a saving of over \$30,000 was made, the only expense incurred being Mr. Randolph's salary and expenses. In the first three months of this year there was a saving of \$28,600, as compared with the corresponding months of last year.

MR. MELCHER has written, at the request of the *Railway Age Gazette*, a letter on proposed federal legislation to promote railway safety. The letter is given elsewhere. As the chairman of the Special Committee on the Relations of Railway Operation to Legislation Mr. Melcher speaks with exceptional authority. His attitude illustrates that of railway managers in general. He concedes that the carriers should do everything practicable to promote safety. But he points out that the public should be informed not only about the improvements railways should make to increase safety, but also about what they would cost. He makes an estimate, based mainly on data secured by the special committee on the Relations of Railway Operation to Legislation, that to comply with the proposed legislation on the three subjects mentioned would cost \$1,361,000,000. The interest on this at 4 per cent. would be about \$55,000,000. The roads would have to get somewhere money to pay a return on the added investment. It is not at all probable that the payments for personal injuries would be reduced more than 25 per cent., which would amount to only \$5,000,000 a year. Mr. Melcher might have added that if payments for a loss and damage to freight and baggage were also reduced 25 per cent., the total cash on account of injuries to both persons and property would be only \$11,000,000 a year. This would leave \$44,000,000 of the necessary return on the increased investment that would have to be secured from increased net earnings. The problem, therefore, is not merely related to operation, but it is also related to an important financial problem. Mr. Melcher has done well to direct the public's attention toward these facts. They are not an argument against safety legislation. They are simply that legislation be not considered without full knowledge of, or regard for, the conditions to which it is to be applied.

THE tone of newspaper comment on the demands of the shop employees of western railways should make the leaders of the labor unions think very carefully before they take the final plunge into a strike. The press, as a whole, is a pretty good barometer of public opinion. Nobody would say that its attitude toward the railways in recent years has been very friendly. Whether the issue has been one between the roads and the shippers, or between the roads and their employees, a large majority of the newspapers have taken the side of the railways' opponents. Therefore, the fact that the attitude of the press in general toward the demands of the western shop employees is hostile is significant. We have not seen a single newspaper editorial which defended them. We have seen many in which the demands and the threats to strike are condemned, or even roundly denounced. The *Chicago Tribune* is regarded by railway men—and this much to their regret, because of its great prestige and influence—as distinctly hostile to the railways. Yet the *Tribune* said editorially on August 30:

"It cannot be unknown to railway employees that, while the wages of men in many industries were reduced after the panic of 1907, theirs were not. Since then there have been general increases. The roads have not fared so well. They have not been allowed to raise rates and have had to submit to cuts. So this is hardly the time for employees to insist peremptorily on material concessions. If they were working for a manufacturing company they would not."

The *Kansas City Journal* said on the same day:

"Conditions are rapidly growing from bad to worse and it must be settled sooner or later whether the owners of railways, bound by stringent

laws to give the public a maximum efficiency of service at minimum rates, shall be permitted to manage their property and give that service in conformity to the law; whether, in short, the people's and the owners' interests should be regarded as subordinate to the interests of employees."

On September 2 the Chicago *Record-Herald* said, after reviewing the demands of the shop employees:

"If, as we are often told, strikes are a symptom of increased business and an upward trend, railway strikes at this conjuncture would puzzle, offend and alienate the 'third party,' the general public. Strikes for higher pay, or shorter hours, or redress of wrongs may at times be 'unavoidable,' in the superficial sense of the term. But when business is not normal, when men are dismissed and forced to live on their savings, even strikes for material, direct, palpable benefits are extremely ill advised. What will the general public think of strikes over recognition of a new federation at such a time? Finally, as the last evident proposition, strikes—like lockouts—condemned by the public are foredoomed to failure."

The New York *Tribune* on August 30 also analyzed the demands of the shop employees, and after condemning them seriatim added:

"Railways are public utilities, operated for the convenience and use of the people, and the people are directly interested in the manner in which they are managed. It would be a monstrous injustice to hold responsible for their management corporations or individuals who had no real authority over it, and it would be absurd to try to hold responsible an organization which expressly disclaims responsibility, or to invest such an organization with authority. It is not by the making of such illogical and extravagant demands as these that labor organizations will win public sympathy in whatever legitimate and reasonable demands they may also make."

The Denver *Republican* also on the same day used the following vigorous language:

"Demands made by the leaders of the 'federation of shop employees' on the Harriman lines are the *reductio ad absurdum* of pinheaded unionism. As well turn the management of the properties over to the walking delegate junta and reverse at one stroke the regular order of business. If the demands made upon the management were granted the union bosses would be running all the roads. The Harriman lines would be conducted for the advantage of the union bosses, not for the good of the public."

More significant, perhaps, than any of these utterances is the following from *The Railroad Employee*, of Newark, N. J., for August, 1911:

"The railway owners, directors and managers of America are at present standing with their backs against the wall, and while the industry remains in its present unsatisfactory state conciliatory and reciprocal, rather than radical and red-flag, means and methods on the part of its servants will unquestionably be productive of the more satisfactory and lasting benefits to every one concerned."

These utterances are typical of what is being generally said. There are no particular demands of the employees that are disapproved. All of them are mercilessly condemned. There can be no question but that these utterances of the press reflect public opinion. With the backing of public sentiment, and with other conditions as favorable to the roads as they could well be, they would be almost certain to win a strike at this time. Victory would give them more complete control of their shops and would warn other organizations against making and pressing such indefensible claims.

THE BRITISH RAILWAY STRIKE.

IT is doubtful whether there is any new lesson to be learned by American railway officers from the recent railway strike in England. Politically, the strike has been worked for all it was worth. It was really an interesting exhibition of opportunism. It would appear that the railway directors and managers have proved better opportunists than the leaders of the men's unions.

The last great agitation among the employees of British railways was in 1907. A "national programme" was drawn up demanding more pay and shorter hours for all grades of workers and recognition of unions. The railways replied that they would continue to consider any demands put forward by deputations from their own staff, but firmly refused to negotiate with intermediary societies whose total membership formed but a small percentage of the total staff. The 1907 agitation was most skillfully conducted by Richard Bell, then secretary of the Amalgamated Society of Railway Servants. Mass meetings were held all over the country and, with the assistance of the daily press, the public and the government were soon thoroughly alarmed. The railways stood firm and busied themselves drawing up emergency time tables and making other preparations for breaking the strike should it occur. The unions' ballot resulted in a large majority in favor of a strike, but at the eleventh hour the government intervened. Lloyd George, then president of the

Board of Trade, had most to do with the negotiations and succeeded in getting the railway companies and the men's unions to agree to a scheme of conciliation and arbitration. This consisted of the formation of local conciliation boards for different grades of employees, such as enginemen, signalmen, trackmen and train and station staffs. Under this scheme any grievances that cannot be settled by the local boards are referred to a central conciliation board. If that also fails to effect an agreement, the railway and the employees select some impartial arbitrator of repute, whose decision shall be binding for a term of years, to settle the points in dispute. But this scheme did not give recognition to the unions, and the leaders have chafed under a falling membership during the past three years. Most of the arbitrators' decisions are binding on both parties till the end of 1913, and it was confidently thought that there was no possibility of a general railway strike in England until then at least. Mr. Bell subsequently retired from the secretaryship of the Amalgamated Society of Railway Servants and was given a government appointment. His successors, however, greeted all decisions under the arbitration scheme with loud complaints that they did not give the men enough. But in nearly all cases substantial improvements have been granted in hours, wages and payment of overtime; although these increases are small compared with the percentage of increase of pay voluntarily granted during recent years by some American roads. Complaints were also made, whether justly or not remains to be seen, that the railways have been too slow in adopting the arbitration awards; and it was even alleged that various subterfuges have been resorted to in order to carry out the awards in the letter but not in the spirit. Nevertheless, it is part of the business of trade union leaders to agitate, nobody took these complaints very seriously or thought that the union leaders would break the 1907 agreement instituting the conciliation and arbitration scheme.

During the past summer there have been a long series of labor disturbances and strikes in England. There was a big strike of coal miners in South Wales, followed by the seamen's strike and a strike of dock laborers at Liverpool and London. The London dock strike had no sooner been settled, by giving the men everything they asked, when the street cartage men of several railways running into London struck. In England the railways do, themselves, nearly all the street cartage work that in America is performed by express and local transfer companies. Partial strikes of railway and other transport workers also took place in various cities throughout the country. So far the discontented railway men were acting largely on their own initiative, but the executive committees of the Amalgamated Society of Railway Servants, the Associated Society of Locomotive Engineers and Firemen, the General Railway Workers' Union and the Signalmen and Pointsmen's Union apparently thought that the time was opportune to make a bold bid for recognition of the unions by the railway companies. So, after a joint meeting, they issued an ultimatum giving the railway companies 24 hours to decide whether or not they were prepared immediately to meet the representatives of the men's societies and negotiate the basis of settlement on the matters in dispute affecting the various grades. After this the government had a long series of negotiations with the companies and the trades unions. But the trades union officials refused the government's offer of the immediate appointment of a royal commission to investigate the whole working of the conciliation boards and grievances in connection therewith, although this offer was accepted unconditionally by the railways. The government, while very sympathetically inclined towards the trades unions, for fear of losing the labor vote at the next general election, nevertheless promised the companies that in the event of a strike the railway's property and non-strikers would be adequately protected by the army and the police. As the chancellor of the exchequer said, the government owed a duty to the public in this matter and would protect the railways at whatever cost, as the whole food supply and the life of the community depended on the railways being kept running.

The men were called out on Thursday night, August 17, and the strike continued for two days, but at no period was it general in the sense of paralyzing the railway service as the men's leaders had threatened. Nevertheless it affected about every large railway in England, with the exception of the London & South Western. Viewed as a whole, the strikers' attempt at holding up communication was a pronounced failure, due to the large number of employees who remained at their posts and the extent to which adequate protection to the right of way lines and stations was afforded by the military and the police. The traffic returns for the week which includes the two days of strike show that for the 52 principal railways of the United Kingdom there was a decrease of over \$2,400,000, or 19 per cent., in receipts as compared with the corresponding week last year. By the evening of the second day the strike leaders appear to have realized that there was no immediate prospect of their "paralyzing" the trade and communication of the country to the extent which they had threatened, while it was evident that in the main public opinion was against the strike. Therefore, it was suddenly called off at midnight on the Saturday. In effect the terms of settlement have given the men no more than was originally offered them. There was at first some misunderstanding regarding the government's offer of a royal commission, which the men's executives understood to mean an inquiry of a dilatory and academic nature. It was also agreed that all the strikers should be reinstated by the companies, and that no one should be sued for breach of contract or otherwise penalized.

But to American railway officers, with the recent decisions of the Interstate Commerce Commission, disallowing the proposed freight rate increases which the railways contended were justified by wage increases, fresh in their minds, the most interesting feature of the situation is the opportunism of the British railways in obtaining from the government an assurance that legislation shall be introduced next session to the effect that in future increase in the cost of labor is to be considered a valid justification for a reasonable general increase of rates within the legal maxima. By giving this assurance the government has promised to bring the law relating to railway rates into something like a logical order, which has been wholly absent since the passing of the Railway and Canal Traffic Act of 1894.

The circumstances leading up to the passing of that act were briefly these: The Railway and Canal Traffic Act of 1888 provided that every railway company should submit to the Board of Trade a revised classification of merchandise traffic and a revised schedule of maximum rates and charges applicable thereto. This was the first attempt at a general classification ordered by Parliament, though many of the companies had previously had in use for several years a clearing house classification, which was amended from time to time. In consequence of this new statutory requirement, the companies framed a new classification and schedule of maximum rates, which were lodged with the Board of Trade early in 1889. This was the subject of an exhaustive Parliamentary inquiry leading to the passing of Provisional Order Confirmation Acts of the several companies in 1891 and 1892. In most cases the new maxima were below the former, but these maxima were in many instances above the rates actually in operation at the end of 1892. When the new acts came into operation, in January, 1893, such rates as were below the new maxima were put up to the highest legal level. This caused such irritation among the traders that they succeeded in getting an act passed in 1894 which provided that any increase of rates above the level of 1892, even if below the legal maximum, would have to be justified before the Railway and Canal Commission. In other words, the companies were forbidden to charge rates which Parliament, after most exhaustive inquiry, had only two years before decided that they might charge. The result has been satisfactory to neither the shippers nor the railways, and has, in fact, prevented any experimental lowering of rates quite as much as any increase.

Under the legislation now promised by the government, the companies will be relieved of the difficult task of distinguish-

ing before the Railway and Canal Commission the increase in the cost of carrying each particular article. It will also prevent the objector from raising the point that the chief increase in cost has been in the passenger traffic, and not in freight traffic. Another point worthy of consideration is that the law in its present form discourages attempts to cheapen the cost of transit. The government has guarded itself by the use of the word "reasonable" from any too sweeping attempt to increase the rates on freight, though the companies, in their own interests, might have been trusted not to seek to place any undue burden on the trade of the country. From the careful wording of the paragraphs it is clear that it has no reference to passenger fares. Within the legal maxima, which are now generally 3d. a mile for first class, 2d. a mile for second, and 1d. for third, the companies at present have full legal power to alter their fares as they choose.

TRAVELING ENGINEERS' CONVENTION.

THE Traveling Engineers' Association held last week the most successful convention in its history. The attendance at the meetings was very large, the papers were splendidly prepared and the discussions were lively and to the point. Two sessions were held each day, the first session usually beginning about 9:30 a. m. and extending to 1 p. m.; the second session beginning at 2:30 p. m. and adjourning anywhere from 5 p. m. to 6:15 p. m. In spite of these long sessions it was necessary to limit the length of time for the discussion of most of the papers, because the subjects were ones in which the members were vitally interested and which they were well fitted to discuss, and also because there were too many subjects on the programme. The latter condition is to be remedied next year, for the executive committee has been instructed to select a limited number of subjects from those suggested by the committee on subjects.

An address was provided for each of the morning sessions, and unlike most of the special addresses which have been made before the smaller mechanical associations this year, each one of the four speakers had a real message to deliver. On the first day Mr. Quayle, superintendent motive power of the Chicago & North Western, spoke on the duties of the traveling engineer. On the second day Mr. Melcher, vice-president of the Chicago, Rock Island & Pacific, expressed his appreciation of the value of the work of the traveling engineer—he is an official who comes in direct contact with the men who actually operate the locomotive. He also told the railway supplymen how they could assist the railways by helping to prevent unwise legislation. On the third day Mr. Foque, superintendent motive power of the Soo Line, outlined in detail a number of ways in which the traveling engineer could increase his efficiency. On the last day of the convention Mr. Dunn, editorial director of the *Railway Age Gazette*, spoke of true scientific management and the part which the Traveling Engineers' Association had in it. All four of the addresses were practical and inspiring.

The association is to be congratulated upon selecting W. C. Hayes, superintendent of locomotive operation of the Erie Railroad, as its president for the coming year. Mr. Hayes made a splendid record as president of the International Railway Fuel Association this year, and is not only a capable presiding officer, but understands thoroughly how to push the work of the association during the year. He is surrounded by a set of enthusiastic and able officers, and next year's convention should be even more successful than this year's.

About 400 members registered and, including the wives and daughters of the members, the invited guests and the supplymen, there must have been at least 1,200 people in attendance at the convention. The banquet hall of the Hotel Sherman and the adjourning rooms were used for the 59 exhibits, which were most attractively arranged. Many southern members were present, and at the last session of the convention they made a strong plea for the 1912 convention. The association has never held

a meeting in the South, and the southern members feel that not only is it due them, but that a great amount of good could be done if the convention took place in the heart of the South where it could be conveniently reached by a large number of members who are now unable to attend the conventions. While August might seem to be an unsuitable time to hold the convention in the South, the records show that the temperature in the southern cities has in many cases been lower than that in the large cities of the North during the past summer. Atlanta, Ga., received by far the largest number of votes, with Chicago second. There seemed to be a strong feeling on the part of many that it would be a mistake to hold the next convention anywhere but in Chicago, since this year's convention has shown conclusively that not only is it possible to get out a larger representation of the members there, but it is most fortunately situated as concerns hotel accommodations and facilities for taking care of the exhibits. The matter is in the hands of the executive committee.

The members of the Traveling Engineers' Association seem to be able to express themselves better while talking in convention than do the members of any of the other mechanical associations, the Master Mechanics' and Master Car Builders' Associations not excepted. This is probably because these men are continually instructing the engineer and fireman in more or less complicated matters, and because they are successful in their work only to the degree to which they are able to express themselves clearly and intelligently. Most of them talk not only logically, but loud enough to be plainly heard throughout the room. This adds much to the value and life of the meetings.

THE UNIFORM CLASSIFICATION COMMITTEE AND ITS WORK

THERE has been more or less demand from shippers and the Interstate Commerce Commission for a uniform classification of freight ever since the commission was created. The railways about three years ago organized a Uniform Classification Committee to do the work necessarily preliminary to the making of uniform classes. Whether they are acting in good faith has been questioned recently. A shippers' paper has intimated that the committee, while making a show of activity, has been doing little. It apparently proceeds under the false assumption, that there can be nothing done in the direction of classification uniformity until a complete classification is submitted for use all over the country. The Official Classification Committee, having issued and widely distributed a public docket of changes proposed in an effort to bring the different classifications nearer together, is represented as having been guilty of some mysterious underhand work. "This sort of manipulation," it says, "has been going on for more than 20 years. It should no longer be tolerated without a protest to the Interstate Commerce Commission."

A month later the Western Classification Committee docketed the changes that had been docketed by the Official Classification Committee, and the traffic men of several commercial organizations appeared before it at Milwaukee, making representations implying that the committee was expecting too much in proposing the immediate consideration of so many items. Their spokesman, by a co-incidence, was H. G. Wilson, of the Commercial Club of Kansas City, where the shippers' paper referred to is published. Mr. Wilson read to the Western Classification Committee a resolution stating that the shippers "urgently requested that, in view of the voluminous subjects in part 2" (of the docket of the Western Committee) "being not in the hands of the public in time for proper consideration, and in the interests of harmony and co-operation, the Classification Committee set a date three to six months hence for a general hearing on all matters in part 2 of the docket." The "voluminous subjects" mentioned were those referred to the Western Classification Committee by the Uniform Classification Committee. That the Uniform Classification Committee has been able to submit for consideration so many changes that the traffic experts of the commercial organizations requested three to six months in which to digest them,

perhaps answers the criticism that it has not been doing anything. As a matter of fact, part 2 of the docket of the Western Committee contained 2,300 items.

Although the number of items up for consideration is large, the number of proposed changes that would affect any particular industry is small, and, therefore, while the representative of a large commercial association might find it hard to inform himself regarding all proposed changes that would affect all the members of his organization within a month, or possibly a year, the traffic representative of any individual concern could familiarize himself with the changes that would affect his concern in a few hours at most.

The *Railway Age Gazette* in 1909 (beginning with the issue of September 3) published articles defining the work for which the Uniform Classification Committee was formed. That committee has nothing directly to do with deciding the classes in which commodities shall be placed, or the rates that shall be charged. Its instructions from the committee of railway executive officers supervising its labors were to frame rules, descriptions of articles, requirements regarding packing, and minimum weights, which could be used throughout the United States. This was a large assignment. It had been ascertained that in the Southern Classification there were 3,503 l. c. l. ratings and 703 c. l. ratings; in the Western Classification 5,729 l. c. l. ratings and 1,690 c. l. ratings; in the Official Classification 5,852 l. c. l. ratings and 4,235 c. l. ratings. These figures partially indicate the extent of the differences between the classifications, and also the very large number of specific descriptions of articles which the committee has undertaken to unify. When it is considered that, in addition to trying to frame for all articles of commerce descriptions that would be accurate, intelligible and of universal application under all the varying conditions of the country, it had to undertake a revision of all the classification rules in effect and to decide on minimum carload weights which could be fairly applied everywhere, it will be seen that the committee was given, and has been engaged on, a very large task. It is a task comparable to, but very much larger than, that which Congress has turned over to the government tariff commission.

About 40 per cent. of the work delegated to the committee has been done. More of it would have been finished but for the fact that the procedure outlined for it was changed. The original plan was for it to proceed continuously with the revision of rules, descriptions and minimum weights until it was ready to propose a complete uniform scheme. But some time ago Commissioner Clark of the Interstate Commerce Commission, who is chairman of the committee on uniform classification of the National Association of Railway Commissioners, made a suggestion, the wisdom of which at once appealed to the railway traffic executives. This was that the committee from time to time during the progress of its work suggest to the territorial classification committees such changes as it had already decided to be desirable in the interest of uniformity. It was pointed out that if the committee's recommendations were adopted from time to time it would be only a short while after it finished its work until uniformity in rules, descriptions and minimum weights would be brought about. Meantime, the benefits of partial and increasing uniformity would be enjoyed by the railways and shippers. For some months, therefore, the committee has been holding conferences with the territorial classification committees, stating, explaining and advocating the changes it has already decided to recommend. It has been charged that the steps toward incorporating the committee's recommendations in the classifications have been taken secretly. They have been docketed by the territorial committees and their dockets have been given the usual circulation before meetings. The Official Classification Committee has been going over the changes suggested by the Uniform Classification Committee for months. The shippers have known this, and all who have made any special effort to find out how their interests might be affected have done so. Many have appeared before the committee. The Official Classification

Committee, to notify commercial organizations of the uniform classification changes proposed in its territory, made an extensive free distribution of its June meeting docket. It is customary for the classification committees to set a date for hearing petitioners who are interested in docketed subjects, whether the subject was docketed by the railway or the shipper. When all have been heard the hearing is closed and the classification committee proceeds with its deliberations. While at its last session in Milwaukee the Western Classification Committee declined to accede to the request of the representatives of the commercial organizations, that consideration of part 2 of its docket be deferred from three to six months, it departed from the usual custom and has kept an open door for nearly two months, considering and hearing all interests regarding the items in that part of its docket.

Many of the objections made to changes suggested by the Uniform Classification Committee have been blanket protests, investigation of which showed that their makers had not used the information available to everyone to ascertain just what was and what was not proposed. The traffic manager of a large organization of shippers handling one line of goods objected before the Western Classification Committee to 48 items in part 2 of its docket. The classification committee showed him that many of the supposed changes to which he objected were not changes at all, and that his arguments concerning other items were based on erroneous assumptions regarding the conditions under which his own traffic was handled. The result was that he withdrew his objections to 45 items.

One thing that has taken a great deal of the time of the Uniform Classification Committee has been the investigation of the conditions under which traffic is handled in different parts of the country, for the purpose of reaching an intelligent conclusion as to what uniform minimum weights should be fixed. Many objections have been raised to the minimum weights proposed by it, but conference has often shown that the shippers making the objections were not so well informed as the committee as to the conditions to be dealt with. In one case the committee suggested advances in the minimum weights applied to certain commodities in western territory. The representative of one large interest protested that the minimums proposed were unreasonable. It was then pointed out that the minimums in question were already in effect in the East, that the largest movement of the commodity was in eastern territory, and that the shipper's own concerns were moving large quantities of goods under the official classification.

The Uniform Classification Committee will continue to submit from time to time to the other classification committees the changes that it favors in the interest of uniformity. It seems probable that in future they will be placed for consideration on each semi-annual docket of the territorial committees.

While the existing Uniform Classification Committee has nothing directly to do with ratings, its recommendations do affect them indirectly. A large shipper of a certain class of goods represented to the committee that he could reasonably load 30,000 lbs. of his goods in a car. The Official and Western Classification Committees, therefore, docketed for consideration, the matter of giving him a uniform carload minimum of 30,000 lbs. He went before the Official Committee, and protested that he could not be reasonably required to load more than 24,000 lbs. That committee fixed the carload minimum on his goods at this amount. The Western Classification Committee then proposed, in the interest of uniformity, to fix his minimum at 24,000 lbs. instead of 30,000 lbs.; this, however, involved raising his rate in proportion to the reduction in minimum. He then appeared before the Western Committee and objected to a change in the rating, contending that he could load 30,000 lbs. in a car. This is illustrative of the position of not a few shippers.

The Uniform Classification Committee in making recommendations regarding carload minimums has acted on the theory that these should be fixed with reference to the physical and com-

mercial conditions under which a commodity is handled. Naturally, the commodity should be given a rating bearing some relation to the carload minimum, the rate per 100 lbs. being higher, of course, when the minimum is low and lower when it is high. As already stated, the committee's present work is merely preliminary to an attempt to fix uniform ratings; and the protests that some of the changes it is now advocating are calling forth doubtless will seem like a tempest in a teapot compared with the storm that will be raised when a serious effort is made to arrange articles in uniform classes throughout the country. Under present conditions a commodity may be in one class in Official, in another in Western, and in still another in Southern territory. Eventually Uniform Classification will necessarily result in reductions of ratings to some shippers and advances in rating to others. Those who, in consequence, have to pay less for transportation will regard the matter philosophically. Those who have to pay more will be dissatisfied, and will make their dissatisfaction known through vigorous protests. There will be ground for the discontent expressed by many of them, for there is not the slightest question that uniform classification, while it may on the whole be beneficial, will result in injury to numerous shippers. That this will be the case cannot be stated too strongly, nor pointed out too often by railway men; for otherwise they will be the object of attack then, just as the Uniform Classification Committee is now the target for criticism for doing things that it must do if the work it has been assigned is to be successfully accomplished.

The railways did not start the movement for uniform classification. They have undertaken to bring it about in response to demands of the Interstate Commerce Commission, of the National Association of Railway Commissioners, and of many shippers. In accepting the committee's work the railway must and will try to protect their own interests by offsetting changes that will reduce their revenues by changes that will increase them. If shippers do not want such disturbance of business conditions as will inevitably result, their proper course is to oppose a uniform classification at all, rather than to wait until the railways have gone to the trouble and expense of framing it and then denounce them for proposing such changes as they must propose if they are to propose a true uniform classification at all. It is greatly to be feared that shippers in general cannot be prevailed on to inform themselves now as to what classification uniformity really will mean.

NEW BOOKS.

Annual Statistical Report of the American Iron and Steel Association. Statistics of the American and foreign iron trades for 1910. Philadelphia, Pa.: The American Iron and Steel Association. Paper, 6 in. x 9 in., 120 pages.

This report is even more full than in former years. It includes complete statistics of the iron and steel industries of the United States for 1910 and the immediately preceding years; also statistics of the coal, coke and shipbuilding industries of the United States. Immigration statistics are given, and also the statistics of the iron and steel industries of all foreign countries.

Explosives and Other Dangerous Articles. Bureau of Explosives, 30 Vesey street, New York. Pamphlet 4¼ in. x 6 in., 45 pages. Price, single copies, postpaid, 25 cents; 100 copies, 10 cents each, delivered at New York; 101 to 500 copies, 8 cents each; over 500 copies, 5 cents each.

This little pamphlet has been issued by Col. B. W. Dunn, chief inspector of the Bureau for the Safe Transportation of Explosives and Other Dangerous Articles, in response to a demand from railway officers and others for a non-technical description of the numerous and frequently mysterious substances mentioned in the regulations which have been issued by the bureau for the safe transportation of explosives. It contains much interesting matter. The portion devoted to explosives fills only seven pages, much the larger part of the work being taken up with inflammable articles, oxidizing materials, and corrosive liquids.

Letters to the Editor.

SOME FACTS ON THE PROPOSED FEDERAL LEGISLATION FOR PROMOTING RAILWAY SAFETY.

CHICAGO, September 2, 1911.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

A recent derailment of a train composed of steel cars has been the subject of editorial comment in newspapers throughout the country. It has been said that the loss of life would have been frightful if the train had been composed of wooden cars.

The accident has therefore been cited as a forcible argument for the use of steel passenger equipment.

A bill to prohibit railways from using, after January 1, 1918, passenger train cars which are not made of steel has been introduced in Congress. It has been stated that the railways oppose such legislation on the sole ground of expense, and that they are less solicitous about the safety of their passengers and employees than they are about money.

Such statements naturally strike a responsive chord in the hearts of many users of railway trains. They suggest to railway officers the need of a more thorough understanding by the public of the problems of safety and of the attitude of the railways thereto.

There is not a railway officer in the country who puts money above human life. That the accident record of American railways is not better is not because railway managers have not striven hard and intelligently to devise and adopt means to reduce accidents. There has been much of legislation to promote safety, and writers on the subject credit such legislation with very salutary results. But such legislation as has been beneficial has been that which has required all of the railways to do what some or many were already doing. The original safety appliances law required the use of train brakes and automatic couplers which the railways for a long time had been developing. These appliances are now in universal use. This is not solely due to legislation. The legislation was suggested by the fact that they already had been widely adopted; and if it had not been passed they might have been in almost as general use as they now are. Most of the legislation proposed is suggested by methods and appliances that the managers of the numerous lines have adopted. The idea of the use of block signals did not originate with the authors of the bills to require their installation. It came from the railway managers who have voluntarily installed them. The railway managers who are criticized as not being properly solicitous about safety have been the pioneers in devising and adopting every existing method that tends to promote it.

Railway managers know better than any other persons the conditions to be dealt with in the matter of safe operation. Conditions vary, and for that reason railway managers differ as to what, at any given time, is the best step to take next. The management of one road considers it advisable to use its available funds in the building of steel equipment before improving its track. The management of another railway differs and believes that its road bed, track and bridges should be strengthened and improved so that all trains can be operated at a fair rate of speed with safety before it invests the money of the company in heavy steel equipment. Still another management believes it better to use available funds for the purpose of installing automatic block signals with which to increase safety of operation and consequent safety of human life. From each viewpoint each one may be right.

There is no unanimity of opinion among experts as to the action of steel equipment in wrecks, and some railway managers may contend that it is safer to operate trains of well constructed wooden equipment on good track protected by automatic block signals than to sacrifice either track or signals for the purpose of purchasing steel equipment.

The forces entering into a collision are indeterminate and the results are unexpected. There may be as many injuries from the overturning of a steel car as from the same accident to a wooden car. If the platforms of the cars remain in line there will be no telescoping, and scarcely any more danger from such an accident to a well designed and constructed wooden car than to a steel car; whereas, if the platforms are not in line, even the steel cars may suffer in a collision with an attendant loss of life.

The steel car, of course, presents less danger from the standpoint of the fire hazard, and it may be fairly stated that there exists no material difference of opinion among railway men that steel equipment will tend to reduce the hazard of operation; but inasmuch as the art of constructing and designing steel equipment is still in the process of development there is no substantial unanimity of opinion as to the best type of steel equipment or the best design through which safety from its use may be accomplished.

Since the opportunity to increase safety is not confined to any one method, and since there are many methods by which safety may be increased, should not each one of the railways be permitted to adopt such of the methods as in its opinion best fits its conditions to arrive at the proper means of safeguarding its operation?

It is manifestly impossible that all railways be required to adopt all means that tend to promote safety at one time for the reasons that will be explained later.

Bills now pending in Congress contemplate that all roads shall use no cars, except steel cars, after January 1, 1918; that the railways shall enlarge their clearances; that the railways shall install block signals.

These things are desirable, and railway managers will concede that all of these subjects are important and relate to matters to which it is the duty of the railway companies to give serious and intelligent consideration. Notwithstanding the attitude of the railway companies, however, and their desire to create a perfect machine in respect to human life, the serious problem is presented as to the manner in which the money can be obtained for the improvements. Before the public imposes upon the railways such duties it should take into consideration the cost, for the cost is so great as to be a matter of public importance.

The Special Committee on Relations of Railway Operation to Legislation has investigated these matters, and reports made to it by its constituent railways indicate that the approximate expense would be as follows:

Substitution of steel equipment for wood.....	\$630,000,000
To enlarge clearances.....	444,000,000
To equip with block signals.....	287,000,000
Total	\$1,361,000,000

The estimate of the cost of enlarging clearances is based on reports received from 109 operating railway companies. The estimate of the cost of substituting steel equipment for wood is based on reports made by 193 roads, aggregating 234,834 miles, and covers a total of 54,609 passenger train cars in service on December 31, 1910, and 4,074 put in service after that date or contracted for. The reports showed, among other things, that of the 4,074 cars put in service or ordered in 1911, 62 per cent. were of steel, 14 per cent. had steel underframes, and 24 per cent. were of wood. The estimate of the cost of installing block signals was based on the assumption that it would cost \$1,200 per mile of single track thus to equip all lines which have not block signals at present. The committee is making a thorough investigation to ascertain how many miles of line are now operated under block protection, and what it would cost to provide signals for the rest of the country's mileage.

It is probable that the figures given are too small. Some roads reported that it is perfectly useless to attempt even to estimate the cost of enlarging certain clearances, as it would involve so heavy an outlay that it would be practically an impossible task. In many cases millions have been spent, in obedience to state laws and city ordinances, for track elevation, elimination of grade

crossings, etc. Compliance with the proposed clearance law might make it necessary to do much of this work over at an enormous expense.

Assuming that the figures are approximately correct, and to get a better idea of their significance, compare them with some other railway statistics. The compliance with the proposed legislation on these subjects would cost not less than a total of \$1,361,000,000. This would be 10 per cent. as great as the net capitalization of the railways of the United States, which amounted on June 30, 1910, according to the Interstate Commerce Commission, to \$14,338,575,940. It would be almost one-half as great as the total operating revenue for all the railways in the fiscal year 1910, which amounted to \$2,750,667,435. It would be over four and one-half times as great as the net dividends paid by all the railways in that year, which amounted to \$293,000,000. The interest at 4 per cent. on the estimated expenditures which it is proposed to require would be at least \$55,000,000 per year.

Do not these figures show that the problem is really financial, not operating? If legislation requiring such an enormous increase in the investment in railways is to be passed, there ought to be considered while it is pending the related problem of how the capital for making the increased investment is to be raised, and how a return on it is to be paid. The return must be paid from net earnings; and the necessary capital can be raised only if there is assurance that rates will be such that the necessary net earnings will be secured.

It may be claimed that the railways will get their return on money thus expended by the saving in amounts paid for injuries to persons; but the fact would still remain that the railways would be obliged to raise this amount of money in order to accomplish whatever saving might be effected.

As to the saving to be effected, the reports of the Interstate Commerce Commission show that in the year ending June 30, 1909, the payments for injuries to persons upon both large and small roads amounted to about \$20,600,000.

Considering that this amount paid for injuries to persons includes casualties from all causes, a large percentage of which are in no way involved with the subjects which it is proposed to cover by legislation, and assuming that a quarter of this amount would be saved by the operation of the proposed laws, it will be seen that even from this aspect the net results would be an interest return of less than three-quarters of one per cent. on the amount estimated to be expended.

It follows that if the government is to require the railways to make such expenditures in the interest of safety, the authority which regulates the rates and earnings of the railways must take that fact into consideration. How, with a tendency toward reduction of earnings and its undoubted effect on the ability of the railways to borrow money, can such expenditures be made?

It may be that the railways in the past have not presented with sufficient clearness to the Interstate Commerce Commission and the public the facts regarding the conditions with which they have to deal in trying to increase safety. Where measures for increased safety involve such tremendous expenditures the railway officer *must* consider how they are to be paid for; and if the public is to require the adoption of safety measures involving such enormous expenditures, it must put itself in the position of the railway manager and consider what measures it shall adopt in order to enable him to find the necessary capital. The people at large must thoroughly understand the situation in which the railways find themselves; and it is the duty of the railways to assist in a candid discussion of what these bills actually mean, and to secure a free expression of opinion by those qualified to speak as to the ways and means of meeting inevitable expenditures of this magnitude. Such a procedure will be exceedingly helpful in the present state of public opinion.

The Interstate Commission in the rate advance cases held that the present rates are reasonable. If the present rates are reasonable, and with them the railways cannot earn money enough to make the vast expenditures which these measures contemplate what process must the railways follow in order to provide the

capital necessary to the ultimate consummation of "safety" legislation?

It appears essential that the commission should have knowledge of prospective as well as current expenditures, for the reason that the commission controls the income of the railways and should know of the prospective outlay which the railways may be required to make for the benefit of the public. It would seem within the bounds of common sense that before congress acts upon proposed legislation it should refer it to the Interstate Commerce Commission for a thorough investigation and recommendation; or the procedure should be so directed that congress will require the Interstate Commerce Commission to submit and recommend in specific terms legislation covering such subjects.

The commission was created to regulate the railways on the correct theory that an expert body in continuous session could do this work better than a law-making body, and, to be consistent, this should be extended to matters affecting operating legislation. The commission should be more competent than any other public body to say what can and should be required of the railways, and yet it is constantly having added to its duties the responsibility of administering laws the enactment of which it has not recommended, and with which, it may not always be in sympathy. With congress passing laws increasing the expenses of the railways without regard to their income, and the commission regulating their income without knowledge of the burdens to be imposed upon them by congress, is it not inevitable that injury will be done to both the railways and the public which they serve?

F. O. MELCHER.

FOREIGN RAILWAY NOTES.

The Imperial Taiwan Railway of Formosa is to be changed to standard gage, and that part of the line running from Taihoku to Keelung, 18.2 miles, is to be double-tracked this year. In the Arisan timber area now being opened up in the lower part of the island, 43 miles of railway are being built. In this section there are about 27,000 acres of timber, the principal varieties being oak, elm, and camphor, with a little ebony. None of the timber is exported, but railway development along with water transportation is expected to change present conditions in the timber trade.

It is said on very good authority that the report of the Swiss commission which has been investigating the question of the electrification of the Swiss national railways will recommend the adoption of the overhead system. This decision has been arrived at after a most careful comparison with the third-rail system as adopted upon the underground railways of London and other electric railways in England. The importance of electric railway working was fully recognized by the Swiss state authorities as far back as 1904, when a commission of 22 experts was appointed to study the matter. Up to the present time three reports have been issued by this commission. The first deals with the probable power requirements of the whole federal system, consisting of 1,830 miles; the second concerns the nature of the traffic; and the third deals with the most suitable system—that is, continuous current or alternating current. The report about to be issued will recommend the adoption of a single-phase alternating-current system, with a pressure of 15,000 v. in the overhead wires. The first work to be taken in hand will be the conversion of the St. Gothard Railway, and comparative estimates have shown that the adoption of the third-rail continuous-current system would involve a capital expenditure of about 8 per cent. more than the overhead system. The total cost of conversion to electric traction upon the overhead system is estimated at \$13,140,000, while the running costs are estimated at about 10 per cent. less than the present cost with steam traction. Although no specific sums were mentioned in the Swiss budget for 1911 for the electrical equipment of railways, certain amounts were included for the acquisition of water power for the generation of the necessary electrical energy, and also for further preliminary calculations.

STATION AND TERMINAL YARDS OF CANADIAN NORTHERN AND GRAND TRUNK PACIFIC AT WINNIPEG.

BY J. SCHOFIELD,
Assistant Architect, Canadian Northern.

The Fort Garry station and terminal yards of the Canadian Northern and the Grand Trunk Pacific at Winnipeg are now nearly completed and will be opened for service soon. They occupy about 75 acres of ground, which is entirely covered by the necessary terminal facilities, including train shed, passenger station, passenger tracks, team tracks, freight tracks and sheds. The accompanying plans show these facilities in detail, and also in-

THE PASSENGER STATION.

The passenger station, which is now practically completed, is a massive four-story structure, with basement. The most prominent feature is the central portion with its great arched windows on all four sides, surmounted by a massive dome 90 ft. in diameter and rising 93 ft. above the level of Main street. The building is 352 ft. long, with a width of 140 ft., and covers a ground area of about 50,000 sq. ft. The front and two ends are faced with cut stone and the track side with white brick. The principal entrance is from Main street beneath a great stone arch, which has massive stone columns on either side projecting 10 ft. beyond the building walls. Beyond this the main vestibule



Rear View of Station and Train Shed During Construction.

dicate the difficulties which were met in getting a practical layout adapted to a through station, in a limited area, bounded, as it is, on two sides by the Red and Assiniboine rivers, and on another side by the main street of the city. The location is the best that could have been secured in Winnipeg, the station building being located on Main street centrally facing up Broadway, and within a few blocks of the intersection of Main street and Portage avenue, the hotel and business center of the city; while the freight sheds are near the wholesale district. On this site was originally situated Fort Garry, which was built in the year 1812 in order to protect the old trading post of Winnipeg.

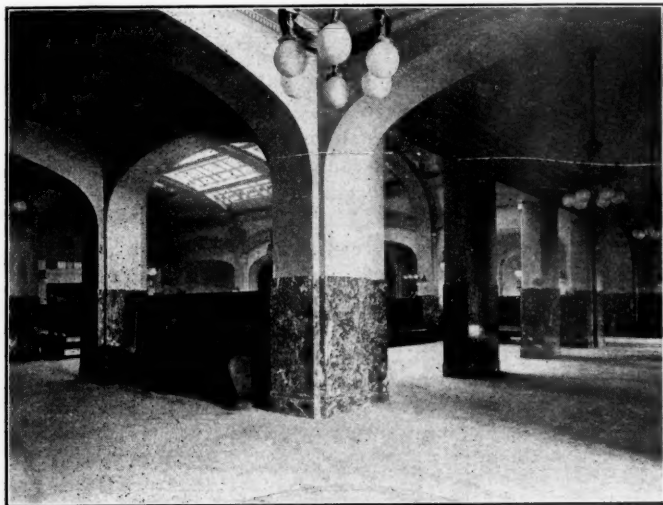
opens into the circular ticket lobby, which is 90 ft. in diameter, and is entirely unobstructed by columns or seats. It is exceptionally well lighted by the arched windows from all four sides. On the east and west sides the windows open directly out, while on the north and south sides they open out on large open courts. Opening off the ticket lobby on the ground floor of the south wing are the ticket offices, baggage checking counters and baggage and express rooms, while the north wing is devoted to the general waiting room, with women's and men's waiting rooms on the side next the tracks, and the restaurant and lunch room on the street side. The central portion of the waiting room and the baggage room are covered over with arched sky-



View of Winnipeg Station from Main Street.

lights 40 ft. x 100 ft., over which are open courts providing light to the inside offices on the upper floors of the building.

The interior decorations of the ticket lobby give the effect of stone construction from the top of the marble wainscoting to the summit of the dome. The walls of the waiting room are embellished with the coat of arms of each of the provinces comprising the dominion executed in gold leaf and colors. The entrances to the offices are directly off the front vestibule with iron and marble stairs and three passenger elevators on each



Waiting Room.

side. The building is finished throughout with oak. The floors of the ticket lobby, waiting rooms and toilets are of terrazo, and the remaining floors of maple.

The basement floor is 15 ft. below the level of Main street, and is devoted to the boiler room, storage, immigrants' waiting rooms and bath rooms, barber shop, laundry, dining and sleeping car supplies and mail rooms. The second, third and fourth floors are entirely occupied by the local and general offices of the two roads, the Canadian Northern in the north wing, and the Grand Trunk Pacific in the south wing. The building is heated by steam and has mechanical ventilation. It is designed so that no artificial light will be necessary, all the space having direct light and ventilation. Owing to the nature of the Winnipeg soil, and to the fact that the high water level of Assiniboine river, 1,000 ft. distant, is only 3 ft. below the level of the basement floor, great care had to be exercised in placing the foundations. All the basement walls and foundations had to be thoroughly waterproofed and drained. The soil at this point is the blue clay common to Winnipeg, the supporting power of which cannot be relied on to sustain a load greater than 2,500 lbs. per sq. ft. The use of piles was necessary, and, concrete piles were abandoned in favor of wooden piles, which were driven beneath the footings 35 ft. to rock. A test was made on a single wooden pile, on which a load of 70 tons was placed after being driven. This load was carried for a period of two weeks without any settlement. Provision has been made in designing these foundations and the steel framework so that four additional stories may be added, as found necessary.

The framework throughout is of steel. The columns are all built up I-beams. The maximum column load is 1,292,000 lbs., and the corresponding cross sectional area is built up with 6 in. x 4 in. x 11/16 in. flange angles, one 12 in. x 1/2 in. web plate and eight 14 in. x 11/16 in. flange cover plates. The lower sections of the columns are about 37 ft. long, and extend through the basement and first story, while the second sections, which extend through the second, third and fourth stories, each of which are 12 ft. 8 in. high, are about 38 ft. long, excepting under the dome, where some are 50 ft. long. Those columns with

heavy loads have widely extended bases distributing the loads across the full width of I-beam grillages seated on concrete footings which are supported on piles. The base plates are 1 in. thick, and project considerably beyond the column flanges. They are reinforced by extended wing plates riveted to the column flanges and by stiffener angles on the wing plates. The grillage beams are entirely encased in concrete, which is extended up to cover the base plates of the columns. The grillages for the heaviest loads are made with four 36-in. I-beams and those for smaller loads are made with three 24-in. I-beams. They are set on rectangular concrete footings reinforced with old rails placed horizontally above the top of the piles. The heaviest column load required 16 piles for the foundation; the 24-in. grillage beams have nine piles and the lightest column loads have only two piles. About 3,000 wooden piles 35 ft. long and about 14 in. in diameter at the top were driven to bed rock for the foundations. With the exception of a few wall columns and some columns in the dome construction, the columns are located at the intersection of longitudinal and transverse lines from 18 ft. 7 in. to 23 ft. apart, and with few exceptions all the girders are

At the second floor level the offices on both sides of the rotunda are connected by a balcony 5 ft. wide around the dome. The second floor box girders are designed for a maximum column load of 632,000 lbs. 2 ft. 10 in. from the end, and have two 25 in. x 3/8 in. web plates in the planes of the angles of the supporting frames. There are also eight 6 in. x 6 in. x 7/8 in. flange angles and two 26 in. x 15/16 in. cover plates besides four 7/16 in. web reinforcement plates under the second story columns.

The dome framing is made with 12 radial trusses, which are supported on columns at the lower ends and are connected at their upper ends to an octagonal framework of vertical trusses which transmit the balanced reaction across the 30 ft. open space in the center. The intermediate trusses are similar to the



Interior, Looking Toward Waiting Room.

main trusses, except they are shorter and of lighter construction, and are supported at their lower ends on horizontal trusses, which connect the columns supporting the dome. The radial trusses have skeleton framework extensions above their top chords to carry the rafters and curved purlins about 6 ft. apart to support a reinforced concrete roof slab 3 in. thick, which is waterproofed and covered with tiles. The arched window which is seen in the front wall of the building is made with a riveted box girder casing which forms a full centered arch rib 38 1/2 ft. in diameter and 15 in. deep. This is divided into five panels by four intermediate riveted columns which are connected

by riveted transverse girders forming window heads and sills.

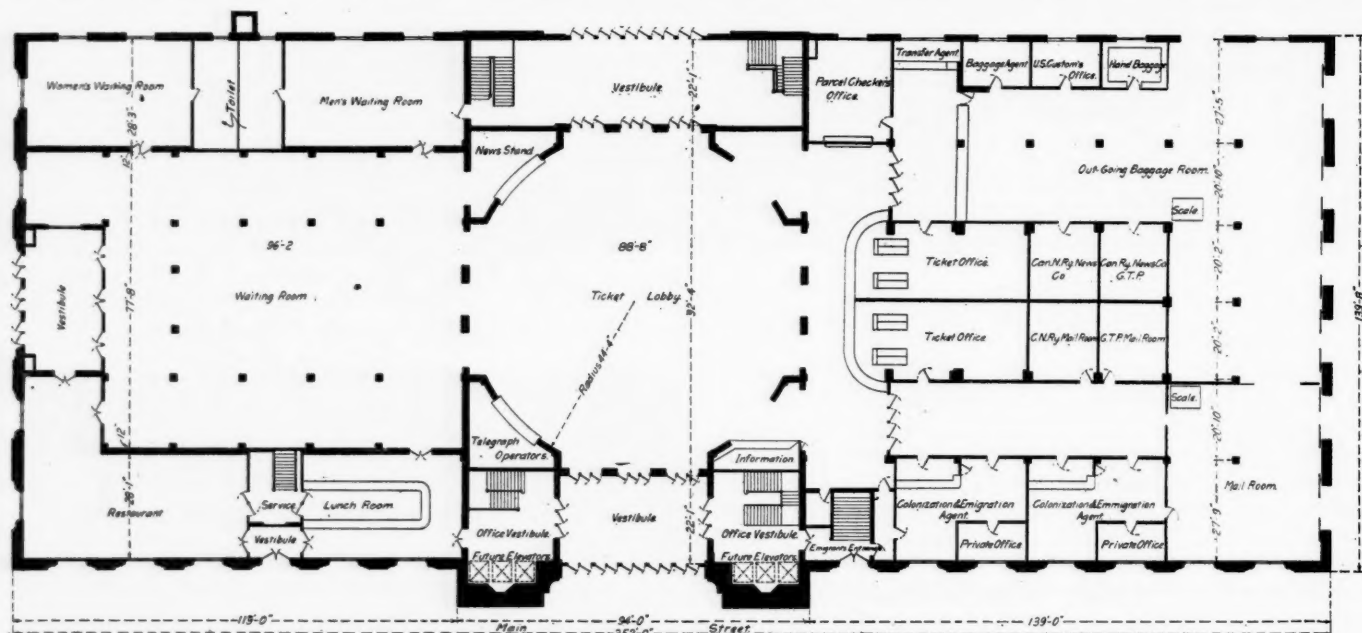
TRAIN SHED AND PASSENGER TRACKS.

A through station layout was adopted, and the approach tracks from the east and west are elevated over the intersecting streets so that they are sufficiently high above the main floor of the station building to allow a passenger subway 50 ft. wide with three sets of distributing stairways each 7 ft. wide on each side beneath. This type is the first of its kind in western Canada. There are eight through passenger tracks, with platforms 20 ft. wide, which will be 1,650 ft. long, and two open running tracks at the rear for through freight trains. By the use of double cross-overs each track is capable of handling two trains of 11 cars each during periods of heavy traffic. The total platform capacity will be 200 70-ft. cars. The platforms are constructed of reinforced concrete covered with asphalt and the top is 12 in. above the base of rail. Between each pair of tracks pipe lines for water, steam and gas will be laid. The subway has a headroom of 10 ft., and is so arranged that there will be no interference between passengers going to and coming from trains. The elevation of tracks over the subway, which has a slight ramp, is 10 ft. above the level of the main floor of the station. Underneath the pas-

bridge about 900 ft. long, one span being a rolling lift. It crosses Mill street, Notre Dame avenue east and Water street on steel plate girders; the portion of the track between these crossings being carried on a concrete viaduct constructed of reinforced concrete walls tied together with steel tie rods and filled between with ballast. These walls and the bottom are supported on wooden piles driven to rock. The base of rail at this section is from 19 to 22 ft. above the ground level. The track from Water street to the 20 ft. trucking driveway is carried on earth supported by retaining walls. All track is of 80-lb. rail on gravel ballast.

FREIGHT TERMINALS.

The freight yard and sheds are reached from Water street at the east end, from Main street, near the Assiniboine river, at the west, and from York avenue in the center. The team yard will contain 42 tracks of a total capacity of 830 40-ft. cars. It will have three distinct leads connected with crossovers, which will be switched with a minimum of operating expenses. The team tracks are arranged in pairs at 12-ft. centers with 30-ft. driveways between. The driveways are paved with sandstone blocks on a 6-in. concrete foundation. The main driveway, 70 ft.



Floor Plan of Winnipeg Station.

senger tracks are located the baggage, express and mail rooms. They are approached from Main street by a 50-ft. driveway, on a 4 per cent. grade, along the south end of the building. On each side of this driveway is a row of electric elevators, one for each platform, in this way avoiding all trucking on the platforms, and affording passengers the entire use of them. The subway and the foundations under the train shed are of steel carried on concrete abutments with pile and grillage foundations. The train shed is the Bush type. It is supported on steel columns with spans of 43 ft. 6 in. and with a clearance of 16 ft. 10 in. from the top of the rail to the underside of the steel trusses. Each bay has two continuous smoke ducts the full length of the shed. The roof is covered with planking and prepared roofing with skylights and ventilators.

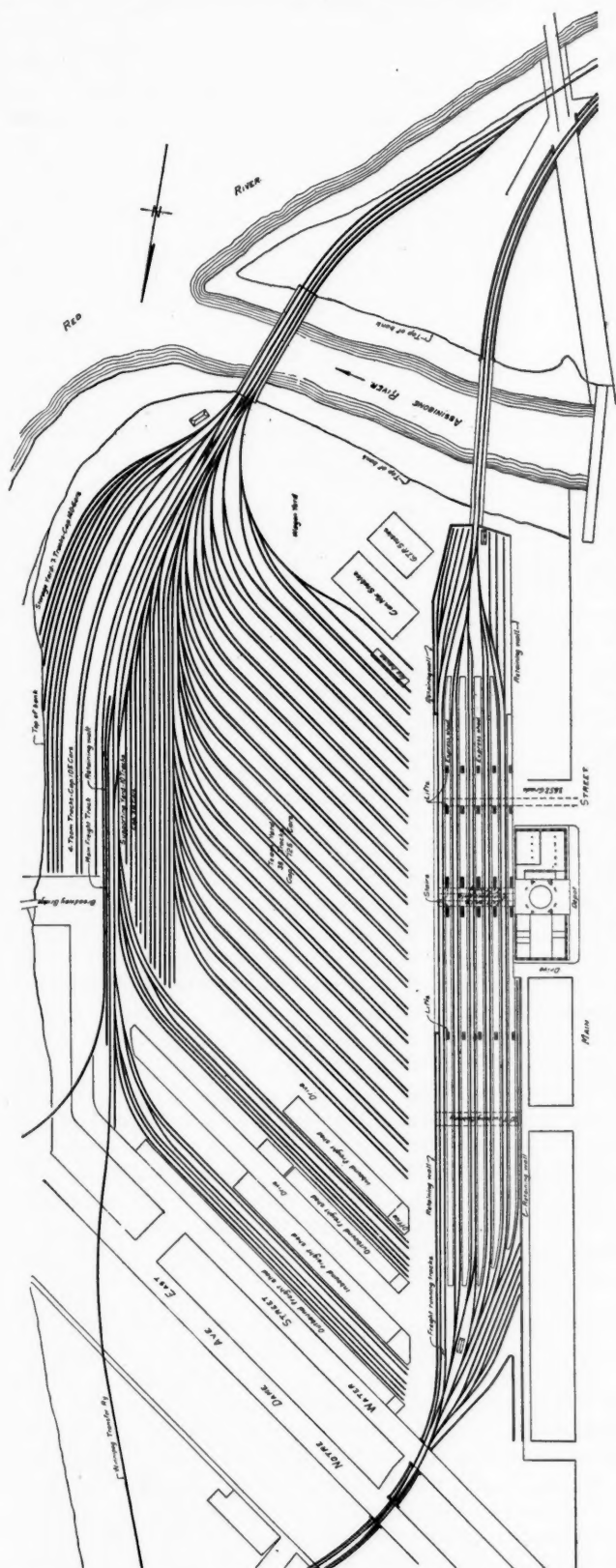
The west approach to the passenger tracks starts from the north bank of the Red river and, ascending on an earth embankment at a maximum grade of 0.4 per cent. compensated, passes over Main street on a double track plate girder bridge allowing an under clearance of 14 ft. 6 in. for the street. It crosses the Assiniboine river on a double track steel bridge 400 ft. in length, one span of which is of the Strauss trunion bascule type, and which will be operated from the interlocking tower. The east approach crosses the Red river on a double track steel truss

wide, starts at Water street and runs the entire length of the yard to Main street near the Assiniboine river, being connected with Main street by subways at York avenue. The elevation of the team tracks at the main driveway is 750 ft., while the passenger yard is 767 ft. The tracks slope from the lead to the ends on an 0.3 per cent. grade and are drained to a 20-in. main sewer discharging into the river.

The freight shed facilities, of which three sheds are completed, will compare four sheds, two inbound 40 ft. x 900 ft., and two outbound 60 ft. x 1,000 ft. Each shed has a two-story and basement brick portion for offices, along the main driveway, while the remainder of the shed is of steel frame construction, covered with tar and gravel roof. The floors are finished with No. 2 maple on account of heavy trucking, and the buildings are equipped with automatic scales. The footings under these sheds are of concrete with a spread sufficient to reduce the loads to 2,500 lbs. per sq. ft. The supporting yard for the freight shed and team tracks is situated to the east of the freight track leads, and has a capacity of 385 cars. This yard is also connected by a transfer track with the C. P. R. The sharpest curves placed so far have been 13 deg., and a No. 7 frog is the standard adopted. For passenger tracks 6 deg. 10 min. will be the sharpest curve with a No. 10 frog.

INTERLOCKING.

The layout requires two towers, one at the north end of the yard near the passenger bridge, and the other at the south end near Water street. They are both electric plants, with the power houses located in the basement of each tower. The north



Track Layout at Fort Garry Terminal Yard; Winnipeg.

tower has 29 working levers in a 72-lever frame and operates 30 functions, while the south tower has 37 working levers in an 80-lever frame operating 40 functions. The south tower also contains controlling apparatus for the lift span of the Assiniboine river bridge.

All the work described is about finished, excepting the team tracks, which are about 75 per cent. completed, and the train shed which is about 85 per cent. done.

This work has been done under the direct supervision of M. H. MacLeod, chief engineer and general manager of the Canadian Northern.

WASHINGTON WORKMEN'S COMPENSATION.

The employers' liability bill of the State of Washington passed by the last legislature, is known as the Workmen's Compensation Act; and it becomes a law October 1. It covers employers' liability to workmen in all lines of industry, employees being divided into classes. Premiums have to be paid to the state at a special rate fixed for each class.

The law provides that each industry in the state shall contribute a percentage of its total pay-roll into the state treasury for the creation of an accident fund, from which the claims allowed for death, total or part disability of employee are to be paid.

Three months' premiums become payable October 1, to cover the remainder of the present year; thereafter the amount is to be paid monthly, except in instances where an industry keeps a sufficient amount on deposit with the state to provide for its accidents; in such case the monthly settlement is waived. All rates are subject to revision, this to be governed by the demands upon the fund, which is to be managed by the state at its own expense.

There shall be no recovery by law where the workman intentionally inflicts self-injury; and the employer, having contributed to this state fund, is not liable at law to employees, their families or dependents, except where injury occurs through intent of employer, in which the recovery may not only be such sums as stated under this law, but suit is permissible for an excess of damage over this amount. The employer is liable to 50 per cent. over the prescribed sum where he has neglected to provide the safeguards and regulations which are required by law.

The law requires that employers report all accidents promptly, and that their records, books and pay-rolls be open at all times to inspection by the commission. Where an employer makes misrepresentation in a pay-roll he is liable to ten times the difference between correct and incorrect figures; refusal to permit inspection of records is held a misdemeanor, with penalty fixed at \$100 for each offense. Failure by employer to contribute a monthly assessment makes him liable to a damage suit by an injured employee in his service, with the abolishment of defenses "fellow servant," "assumption of risk" and "contributory negligence." Premiums cannot be deducted from the wages of workmen, and violation is held to be a gross misdemeanor, punishable by one year's imprisonment or a fine of \$1,000, or both.

A schedule of payments for death, and for total or partial injury is prescribed. This is a sliding scale of monthly or lump sum amounts, ranging from burial expenses, \$75 up to \$4,000. Their is provision for monthly payments to widow, or invalid widower, of \$20 while unmarried, and lump sum of \$240 upon remarriage of the widow. In case of partial disability, a loss of foot, leg, hand, arm or the like, a cash lump sum of \$1,500 is to be paid to the workman. Where an injured workman resides or moves out of the state, lump sum payments may be awarded by the commission, not to exceed the amount of \$4,000, and based on the table of American mortality.

Any decision rendered by the commission is subject to appeal in superior courts. The commission is composed of three members appointed by the governor; G. A. Lee, Spokane; G. A. Pratt, Tacoma; and J. H. Wallace, Seattle, representing the legal profession, manufacturers and employers, and employees, respectively. The sum of \$150,000 has been appropriated by the legislature to put this act into effect.

TRAVELING ENGINEERS' ASSOCIATION

The nineteenth annual convention of the Traveling Engineers' Association was held at the Hotel Sherman, Chicago, August 29 to September 1. F. C. Thayer, of the Southern Railway, Atlanta, Ga., presided and, after an opening prayer by Rev. W. S. Abernethy, made an address in which he directed attention to the importance of the traveling engineer in increasing the efficiency of and reducing the cost of operation; in securing the more economical use of coal, oil and other supplies; in introducing proper tonnage ratings, and in securing higher standards of efficiency for both the engines and the enginemen. The report of the secretary, W. O. Thompson, showed a membership of 812, an increase of 5.4 per cent. during the past year. He has a balance of \$384 on hand, with no liabilities, and a considerable amount still due for membership dues, advertising and for examination books. The report of the treasurer, C. B. Conger, showed a balance on hand of \$1,328.

THE DUTIES OF THE TRAVELING ENGINEER.

Robert Quayle, superintendent motive power of the Chicago & North Western, made a characteristic extemporaneous address on the duties of the traveling engineer. An abstract of his address follows: Unlike the old adage, "Man works from sun to sun, but woman's work is never done," the traveling engineer must have the responsibility of his position on his mind at all times. Thinking makes the man, and the man who keeps his thought fixed on the thing in hand will steadily but surely rise to the top. If the minutes are taken care of in this way the hours will take care of themselves. The accomplishment of tasks today makes possible the doing of more difficult things tomorrow.

You must have certain ideals fixed before you toward which you are striving. If not, you would not hold your present position or else someone has made a mistake in appointing you to it and you will eventually be found wanting. "You can catch more flies with molasses than with vinegar." Kindly treatment begets kindly treatment, and you must use it to get the best results from the men under you.

The traveling engineer's duties are twofold—he must stand for the men, and he must stand for the company. Get the men with you and stand with them. They will pull for you, and thus for the company which you represent. Be honest! If you believe an engineman is not doing his best, ask him what is wrong with his fireman, and if he replies, "Nothing," ask him about his engine. He cannot blame it on the engine if you are on it and can see for yourself that it is all right. Then you can put it up to him. Tell him you can afford to give him \$1,000 or \$1,200 a year to stay at home and put some one else in his place. It will touch his pride, for he will not want to be classed below the average. It will make him think, and there will soon be something doing, for the truth pinches and squeezes hard.

The traveling engineer should keep things stirred up, not alone with the enginemen, as suggested above, but with the roundhouse foreman, the master mechanic and the superintendent motive power. If the roundhouse foreman allows work reported by the engineer to go out unattended to, it will make the engineer careless in reporting work. Ask the foreman why it was not attended to, and if he pleads the lack of help, ask him why he did not get more. Keep after and pound the master mechanic and superintendent motive power for the assistance or co-operation which they should give. Do not report favorably on a device because your superiors are interested in it, financially or otherwise. They want to know the truth about it.

Ninety men out of 100 are lacking in force. When you get a good idea do not let it die because of being too lazy to develop it. If you have force and intelligence your superiors will be only too glad to back you up.

ACTUAL DEMONSTRATION VERSUS ORAL INSTRUCTION IN AIR BRAKE OPERATION.

Committee:—John P. Kelly, chairman; W. V. Turner (W. A. B. Co.), Wm. Owens (Lehigh), F. E. Evans (D. L. & W.), Malon LaQuay (N. Y. A. B. Co.).

Experience in air brake matters has demonstrated that the man who has a clear and comprehensive grasp of the fundamentals, and at the same time possesses ordinary judgment, meets with greater success in the practical affairs of service than he who possesses a large detail knowledge of the apparatus, but is lacking in the understanding of the necessary principles and in judgment.

Answers to the circular of inquiry with but one exception stated that an actual demonstration on the road of how brakes should be handled was considered of greater comparative value than oral instruction telling how they should be operated, and all replies were unanimous in considering that whatever oral instructions were given should deal more with the essentials of the brake equipment and should treat largely of the fundamental principles on which it is based; emphasis was also placed on the importance of instructing how to detect and remedy serious defects that may arise. The experience of those sending in replies indicated that whenever a road foreman took hold of the brake and made a successful exhibition of skill in handling it, where before the engineman was unable to do this, he not only usually succeeded in improving the work of that man but afterward had his entire confidence, and the demonstration made for much better subsequent service and better mutual understanding all around.

Our greatest trouble at present is in handling smoothly long freight trains, and without breaking them in two. It is evident that the rules in vogue some few years ago will not answer the purpose today. This is because the greater number of cars equipped with air brakes hauled in a single train, the uneven distribution of braking power due to the make-up of the train, and the heavier locomotives used in hauling them, make it almost impossible to find two trains that will handle just alike, and therefore no fixed and unalterable method of braking will apply in every case. It is therefore necessary to formulate a method that will make it reasonably certain that a service stop can be made in the large majority of cases without breaking the train in two, and without severe shock. It is in such cases that the practical demonstration is of great utility, and makes for improved service; in fact, it seems to be the only thing that will bring success, for where no two trains brake just alike it is evident that oral instruction cannot be made to apply except in the most limited manner, for here the individual must rely largely on his own judgment and experience.

DISCUSSION.

The engineman should thoroughly understand the fundamental principles, and the more he knows about the details of construction and operation the better, for it will enable him to more readily locate and remedy any troubles which may arise. The advisability of the traveling engineer attempting to give actual demonstration in the handling of air brakes was discussed at some length. On one hand it was stated that the traveling engineer, with his manifold duties, and especially where his district was of considerable extent, could not possibly handle the air brakes as well as the engineer who made the run daily and was thoroughly familiar with all the conditions. On the other hand it was stated that the instruction in the air brake car was actually comprehended by only about 3 out of 10 men, and that someone, preferably the road foreman, must give practical demonstrations on the road to the other 7. The conditions in the air brake instruction car are uniform, while on the road the engineman

has to contend with air leaks, variable loading, the physical characteristics of the division, weather conditions, etc. The handling of the brakes under these variable conditions must be practically demonstrated to 7 out of every 10 men.

The engineer should not be blamed for the bad results due to defective equipment, and yet he is partly to blame if he is not able to demonstrate that it was not his fault. One road foreman said that in cases where men did not seem to understand how to handle the brakes properly on a certain run, he had them make the run with men who were handling their trains exceptionally well. It was suggested that practical demonstration was specially valuable on mountain roads because of the serious consequences which might follow a misunderstanding of instructions as to the proper method of handling the air brake.

On the Lake Shore & Michigan Southern the enginemen are instructed to carefully study the effect of the first brake application on a long train. If there is a high braking power at the rear end of the train keep the train stretched and keep air blowing from the brake pipe exhaust after the train comes to a stop. If the heavier braking power is near the front end, shut off in ample time to allow the train to bunch. Tests of a large number of station stops had shown a reduction of from 50 to 75 to from 35 to 40 seconds in the time of stopping by making a reduction of from 20 to 25 lbs. before shutting off.

In closing the discussion Mr. Kelly said that we must be more efficient and economical in educating the men. Instead of teaching them a lot of things of little actual value we should concentrate on the vital things and use practical demonstrations where necessary.

JACOBS-SHUPERT FIREBOX.

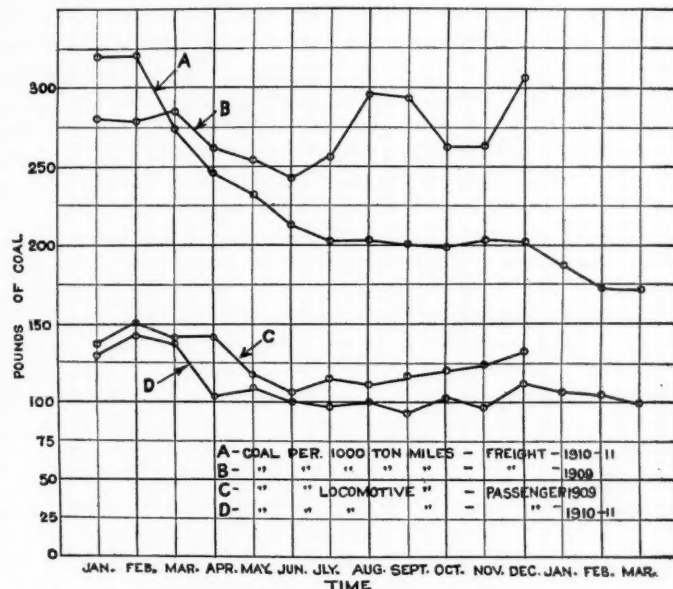
A. W. Whiteford, mechanical engineer of the Jacobs-Shupert Firebox Company, New York, gave an illustrated address, describing in detail the construction and methods of manufacture of this box and explaining why it was considered superior to the ordinary type. There were a number of questions asked at the close of the lecture, but no discussion took place. A description of this box will be found in the *Railway Age Gazette* of May 28, 1909, page 1123 and November 18, 1910, page 965.

PRACTICAL INSTRUCTION IN FUEL ECONOMY.

V. C. Randolph, supervisor of locomotive operation, Erie Railroad, read a valuable paper on this subject, of which the following is an abstract: It is not the intention to theorize as to what might or could be done, but to narrate what has been accomplished in actual practice on a railway, where on several divisions supervisors of locomotive operation were appointed who have charge of all locomotives in service, for the purpose of improving economies in the use of fuel, lubricating material, tools and other supplies. In the beginning, it was thought advisable to first try

it out on one division. The writer was accordingly assigned to inaugurate the work on the Allegheny division in January, 1910.

The accompanying chart shows graphically the saving that was made on freight and passenger locomotives during 1910, as compared to 1909; also the record for the first 3 months in 1911.



Record of Coal Used in Freight and Passenger Service on the Allegheny Division of the Erie During 1909, 1910 and First 3 Months of 1911.

The curves for the passenger locomotives are based on the pounds of coal used per locomotive mile, while those for freight service are on the basis of the coal used per 1,000 ton-miles. It will be noted that the savings during the first 3 months of 1911 were nearly as great as for the whole of 1910.

COAL SAVED ON ALLEGHENY DIVISION OF ERIE RAILROAD FOR FIRST 3 MONTHS OF 1911 AS COMPARED TO SAME MONTHS IN 1910.

January.....	Passenger	512.67	\$748.50
February.....	Passenger	723.38	1,063.37
March.....	Passenger	794.29	1,016.69
			\$2,828.56
January.....	Freight	5,988.42	\$8,743.09
February.....	Freight	6,431.56	9,454.39
March.....	Freight	4,512.74	5,776.31
			\$23,973.79
January.....	Work	143.63	\$209.70
February.....	Work	326.48	479.93
March.....	Work	47.07	60.25
			\$749.88
January.....	Switching	334.47	\$487.35
February.....	Switching	122.11	179.50
March.....	Switching	302.15	386.75
			\$1,053.60
Total saving			\$28,605.83

COAL SAVED BY MONTHS ON ALLEGHENY DIVISION OF ERIE RAILROAD, 1910-1909.

Passenger Service.			Freight Service.				Work Trains.				Switching Service.			
	Tons Coal	Money	Tons Coal.		Money.		Tons Coal.		Money.		Tons Coal.		Money.	
Month.	Saved.	Saved.	Saved.	Lost.	Saved.	Lost.	Saved.	Lost.	Saved.	Lost.	Saved.	Lost.	Saved.	Lost.
January.....	193.10	\$235.58	.....	1,470.17	.....	\$1,793.61	126.50	.....	\$154.33	.....	.....	285.69	.....	\$348.54
February.....	170.76	218.56	.....	1,396.94	.....	1,788.08	281.32	.....	360.09	.....	.....	221.08	.....	282.98
March.....	52.83	65.51	484.27	.....	\$600.50	.....	.....	42.79	.....	\$53.06	.....	238.11	.....	295.26
April.....	810.35	1,142.59	537.43	.....	757.78	.....	.....	426.57	.....	601.46	.....	76.30	.....	107.58
May.....	246.52	322.80	756.90	.....	991.50	.....	.....	54.15	.....	71.00	.....	21.74	.....	28.47
June.....	163.35	206.00	1,020.37	.....	1,287.70	.....	307.15	.....	287.20	.....	.....	85.53	.....	107.84
July.....	393.51	499.00	1,881.34	.....	2,389.90	.....	243.71	.....	309.80	.....	51.25	.....	\$65.10	.....
August.....	290.95	374.10	1,450.42	.....	1,872.00	.....	312.81	.....	403.80	.....	121.32	.....	156.60	.....
September.....	524.61	676.30	1,852.32	.....	2,390.00	.....	203.64	.....	262.30	.....	10.34	.....	13.35	.....
October.....	446.52	554.00	4,991.30	.....	6,199.10	.....	256.62	.....	318.30	.....	270.28	.....	335.00	.....
November.....	644.00	824.00	3,728.50	.....	4,770.00	.....	.....	22.26	.....	28.50	46.26	.....	59.20	.....
December.....	603.87	730.00	4,675.30	.....	5,659.00	.....	24.18	.....	29.23	.....	.....	111.57	.....	135.00
	4,540.37	\$5,848.44	21,378.15	2,867.11	\$26,917.48	\$3,581.69	1,810.08	491.62	\$2,196.05	\$683.02	499.45	1,040.02	\$629.25	\$1,305.67
Net Saving = \$5,848.44			Net Saving = \$23,335.79				Net Saving = \$1,513.03				Net Loss = \$676.42			
Total Net Saving—all classes service—1910 as compared to 1909 = \$30,020.84														

NOTE.—Apparent discrepancy between tons of fuel saved and its money value is due to the fact that the price per ton was not uniform over the entire period considered.

The author then went on to tell in detail just how these savings were accomplished, and, as developed during the discussion, the only cost to the railway to offset these savings was his salary and expenses. He said in part: Beginning in the middle of a hard winter when traffic was congested, with consequent long hours on the road, with several new engineers and firemen and other adverse conditions that had an influence toward increasing the consumption, and which are familiar to all, it could hardly be expected that very much of a showing in fuel economy could be effected from the start. Also, it required a little time to grasp the situation and become familiar with the proposition. To first attract attention to the importance of economy in the use of fuel and reach as many at a time as possible, instruction classes were held weekly for several months, where engineers, firemen, hostlers, engine preparers, fire cleaners, and, in fact, all having to do with the use of fuel, were thoroughly instructed in its use, after which the meetings were held periodically, or often enough to help keep all concerned interested. As a drawing card other subjects pertaining to locomotive operation, air brakes, etc., were occasionally taken up and discussed, a large blackboard being used for the purpose of illustrating the importance of saving every pound of coal possible. A shovelful of coal saved for each locomotive mile on the Allegheny division would amount to \$19,314.24 for the year; for the entire system it would amount to \$330,514.56 for the year. The loss through the pops, on the basis of 15 lbs. of coal per minute while one of them is open, would amount to \$177,390 a year on the Erie Railroad on a conservative basis.

Other wasteful practices are: Overloading tenders, allowing coal to work out and rattle off, shaking good fire into the ash-pan, firing too heavily and bringing engines into terminals with heavy and very dirty fires. However, these losses are small, compared with what the engineer may waste by leaving the reverse lever in the corner too long in starting, and not working steam as expansively as possible when running; also by not taking advantage of supplying water to the boiler at the proper time; running too fast between stations, especially on local trains, and then waiting for time; also working steam longer than necessary and then checking speed with the brakes.

A number of drawings were made showing sections through the firebox and the effect on the temperature of the gases due to wrong methods of firing, and also demonstrating the advantages of cross firing. The method of cross firing recommended is as follows: (1) Shovel to left front corner, (2) right back corner, (3) right front corner, (4) left back corner, (5) left side two-thirds distance from back end of box, (6) right side one-third distance from back, (7) right side two-thirds distance from back, (8) left side one-third distance from back. This method tends to keep the fire nearly level, except that it is a little heavier next to the sheets to prevent too much air entering at these points, as the air will not be heated to the igniting point until it gets near the middle of the firebox on account of the temperature near the sheets being held down by the heat absorbed by the water on the opposite side of the sheets. We have also found it very convenient and instructive to draw on the blackboard views of the boiler and firebox, and explain how the draft is created and equalized evenly over the fire, the effect of steam or air leaks into the front end, and why, if a lighter fire was often carried, it would be possible to run with a larger exhaust nozzle, thereby reducing the back pressure on the pistons and doing the same work with less fuel.

It is a good idea to explain the approximate amount of air necessary for the proper burning of the coal and the necessary temperature to maintain for good combustion; the difference in the number of heat units generated when the temperature is what it should be, and what it often is with an insufficient amount of air present, etc. While it may not be essential for a man to know all about the science of combustion to make a good fireman, we believe the more one does know about his business the better and the quicker he can get satisfactory results. After explaining that three things are always necessary for combustion, i. e., the

fuel or substance to be burned, the oxygen with which to burn it, and the igniting temperature, some simple illustration should be made to prove it. In the absence of something better a common match may be used, explaining that different substances burn at different temperatures, but that it is always the same for the same substance. For example, phosphorus combines with oxygen at a temperature of only 150 deg. Fahr., which is generated by friction when the match is struck on any rough surface; its burning brings the temperature up to 500 deg. Fahr., at which the sulphur burns, with the result of raising the temperature of the wood next to the burning sulphur to its igniting point, which is 1,000 deg. Fahr., when it also burns. However, not all at once, but only as the required temperature is reached.

To burn coal successfully, the firebox temperature must be maintained above 1,800 deg. Fahr. This explanation and some little object lesson to prove that air is necessary for combustion, should convince all of the necessity of feeding the fire lightly and often, with the required amount of air entering the firebox. The fireman should be taught that heavy firing is wasteful and should be avoided. The quantity of coal to be fired at a time depends on its quality, the size of the engine and the amount of work performed. When firing, the firebox door should be closed after each shovelful, and the coal scattered over as much of the fire, where needed, as possible.

By having the coal broken into small pieces of uniform size it presents a greater burning surface and causes quicker ignition than when large lumps are thrown into the firebox; it also allows the air to enter the fire in small streams and furnish the necessary amount of oxygen to create a higher and more uniform temperature. The engineer should be taught to treat the fire as lightly as possible in starting and afterwards to work steam as expansively as possible consistent with the running time. As the proper handling of the injector is one of the most important points in fuel economy, he should take advantage of the most favorable times to supply water to the boiler, considering it as a storage plant, and instead of allowing the pops to blow, utilizing the space to store energy as long as dry steam can be used, even though the water level is above its customary height.

In starting, the supply should always be shut off until the train is brought to a fair speed at least and the fire nicely burning, after which, if on a through train, the supply should about equal the demand, i. e., keep water uniformly level; if a local train, a little water should be lost between stations and regained while drifting into, standing, or switching at stations. By supplying a little less water than is being used between stations, it requires less coal when using steam and leaves space in the boiler so the injector can be worked to avoid the pops opening when the throttle is closed.

The cleaning and keeping of fires at terminals is a very important question. A great saving in coal can be effected in cleaning fires by leaving them in proper condition and plenty of water in the boiler when they arrive on the ash-pit. This requires the co-operation of the engine crews and hostlers. The fire should be burned comparatively low, especially at the back end of the firebox, as about the first thing the fire cleaner does is to drop the back dump grate. As a protection to the flues the fireman or hostler should, before leaving the engine on the arriving track, throw a few shovelfuls of coal into the forward end of the firebox. In cleaning the fire, any unburned coal or live fire in the back end should be pushed ahead, the back section of grates shaken, then the dump grate dropped (when the dump is next to door sheet), and any clinkers broken up and disposed of. The forward section of the grates should then be shaken and any clinkers pulled back and forced through the dump. After this operation the grates should be leveled and the dump grate closed. If the engine is to lay over several hours, the fire should be pushed ahead, leaving the dump and one or two grates bare, then covered over as the condition of the fire warrants, in all cases sufficiently to prevent the pops opening. When the engine is ordered, the fire should not be broken up until shortly before

leaving time, unless necessary on account of poor fire. The excessive use of the blower should be guarded against at all times and especially when cleaning the fire. The roundhouse foreman and staff should understand the importance of keeping the draft appliances, grates and flues in proper condition.

The condition of the locomotives is the governing factor in effecting fuel economy, and it would be poor policy to neglect repairs that would cost a few dollars and by so doing consume perhaps a hundred dollars' worth of coal per month or even more. The location of the steam gage should be given more attention, particularly on the large locomotives, as close firing requires close observation of the pressure. If a swing door, the latch should hold it positively open when putting in coal; when practical, a small chain should be provided, hung from some convenient point and only slack enough to allow it to drop into place. The deck sheet should be closely fitted, leaving no holes for coal to drop through. By looking after these apparently small points it helps to get and keep the co-operation of the engineer and fireman, and in this way a greater reduction in fuel may be made than by any device which can be applied to a locomotive.

The benefits derived by educating firemen in the art of handling fuel and the savings effected thereby have resulted in issuing a book called "Good Firing," which is given to each fireman when entering the service; a book of elementary questions also is furnished at the same time. At the expiration of his first year's service he is required to pass a written examination, which is verified by an oral one conducted by the road foreman of engines or other persons appointed by the proper authority, necessary knowledge being obtained from the book furnished, attendance at instruction classes held by the road foreman or supervisor of locomotive operation; also from information received and instructions given him by either, when on the engine or otherwise.

At the end of the first year and after passing the examination, the first year's question book is returned and the list of questions on the second series is given him. At the expiration of the second year, another examination follows, which is progressive in form, it being a little harder to obtain the answers. The third year's series consists of his final mechanical examination, which, if satisfactorily passed, qualifies him as a locomotive engineer.

Individual Performance Sheet.—To create interest in a competitive way among all engineers, an individual performance sheet is issued monthly on each division, which shows the name of each engineer, the number of his engine (when regularly assigned), the engine mileage made by each engineer, the amount of lubricating material used and cost per 1,000 locomotive miles, also the miles made per pint of oil. It also shows the number tons of coal used and cost per 1,000 ton miles in freight service, and the number tons of coal used and cost per 1,000 locomotive miles in freight, switching and passenger service, respectively. In freight service the total ton-miles moved are also shown. The cost of tools and other supplies is shown on the 1,000 locomotive mile basis for all classes of service. A percentage column relates entirely to each of the three sub-divisions, the percentage being based on the lowest performance, i. e., the lowest in cost will be classed as 100 per cent., all others being of a corresponding ratio. While costing considerable time and money to prepare a report of this kind, it has proved itself to be a good investment to the company, for as a rule each engineer and fireman takes pride in trying to reach the 100 per cent. mark.

DISCUSSION.

The discussion developed the fact that the only expense incurred by the railway in securing the large savings mentioned, except for the performance sheet which had previously been in use, was in Mr. Randolph's salary and expenses. Also that the greater part of the instruction was by means of practical demonstration on the locomotive. One grade revision was made in the early part of 1910, but very few trains were run over the cut-off until October, 1910. All other conditions, physical and operating, were the same as for the previous year. One

speaker said that engineers and firemen soon lost interest in fuel saving if accurate means were not at hand for keeping a close check on the amount of fuel used. It was also suggested that a fuel performance sheet, to be effective, must take the varying conditions of operation, etc., into consideration. That is why the ordinary performance sheet does not accomplish its purpose. The men should be grouped in classes, so that they can be compared.

The enginemen cannot be expected to make great efforts to save fuel by the scoopfull, if they see it wasted in innumerable ways before it gets on the tender; therefore the importance of fuel saving should be appreciated by the entire organization from the top down. Smoke is not due to a low temperature in the firebox for the hydro-carbon gases are colorless until they are split up at a temperature of 1,800 deg. Fahr. It is rather because there is not sufficient oxygen in the air to combine with the carbon as it is released from the hydrogen. Opening the fire door cools the fire and allows the hydrocarbon gases to escape in a colorless form and without being consumed. Proper banking of fires at terminals is most important. If banked at the front flue sheet they keep the flues uniformly heated; if banked at the rear, hot gases rise and pass through the upper flues, but cold air comes up through the grates and passes through the lower ones causing leaky flues. Reach rods are too long on most engines. They were shortened on the Erie with splendid results.

The performance sheets mentioned in Mr. Randolph's paper were in use before his work was started on the Allegheny division. The engineer when taking coal gives a ticket to the men in charge of the coaling station.

On the high capacity locomotives where the fireman is forced to work near his limit, the problem of closing the fire door after each shovelfull becomes a serious one. Several of the members spoke very favorably of the use of automatic fire doors under these circumstances. An instance was also cited where the heat prostrations during the summer months were greatly reduced, due to the application of such doors. The company should do its part in making the work of the men easier. Undoubtedly the engineer would just as soon hook the lever up a little higher, if he was sure that it would not interfere with the lubrication of the valves and cylinders, and if the lever could be easily handled, so as not to threaten to jerk him off the seat box.

Mr. Randolph said in reply to a question that in riding the engines he checked the work of the fireman carefully. By means of a counter in his pocket he kept track of the number of shovelfull fired. Of course the different firemen vary as to the amount they carry on the shovel, but by watching closely this could be estimated with a fair degree of accuracy. The figures at the end of the run were checked against the amount of coal remaining on the tender. In this way it is possible to get a good line on the men, especially when a number of records have been taken for different men on the same run and under similar conditions.

Where a man's record is poor, as shown by the monthly performance sheets, the matter is taken up with him privately; letters are used only under extreme conditions. The transportation department has assisted in the work where matters have been called to its attention which could easily be remedied. On the Allegheny division of the road the coaling stations are such that a fairly accurate estimate of the coal given to each engine is possible.

One speaker said that the first place to begin fuel economy was in improving the condition of the engines. He also experiences a great deal of trouble in securing firemen and believes that the only solution of the problem is in the introduction of mechanical stokers. The best results in obtaining fuel economy are only possible with the hearty co-operation of the higher officials; the road foreman must have their backing to enforce his orders. The discussion of this subject was only closed because it had taken so much time that it promised to interfere with the other work of the association.

MR. MELCHER'S ADDRESS.

F. O. Melcher, vice-president of the Chicago, Rock Island & Pacific, made an address Wednesday morning in which he commented on the value and importance of the work of the traveling engineer, and then, speaking more especially to the supplymen present, told how they might assist in securing fair and square treatment of the railways in matters of legislation. Following is an abstract of the address: The traveling engineers are the points of contact of the operating organizations through which the effort for mechanical efficiency and operating economy is conveyed to the men who physically move the traffic. They supervise directly and personally "the man behind the gun." The concentrated authority in the matter of instructing the engineer and fireman in the economical and efficient method of handling his engine is mainly with the traveling engineer. It may be due to the personality of the traveling engineer that the engineers and firemen under his direction are good and loyal servants; or it may be due to his lack of tact and proper comprehension of his duties that the employee may misunderstand the attitude of his employer in many things. I wish to express the appreciation of an operating official of the responsibilities of the traveling engineers, and of my friendship and my willingness at all times to give them the proper co-operation and support—and proper support is particularly needed by our subordinate officers in these days.

There was a time when the engineer was the master and the fireman the apprentice; when the fireman learned his trade from the engineer; when the engineer hired the fireman and the fireman had a feeling of obligation to the engineer; when the result was a close and intimate relation between the men on opposite sides of the engine; when there was no conflict of jurisdiction. In the evolution of things the relationship between the fireman and the engineer naturally became changed. The engineer's trade is one thing and the fireman's trade another. The engineer may belong to one organization and the fireman to a rival organization embracing the same class of employees. The system of apprenticeship that formerly existed to a large extent, is now gone. Where the attitude of both the engineer and the fireman is right there is no reason why that relationship should not exist today. Where there is indifference of either side to the other the situation is changed and the problem of instructing the fireman in the duties of an engineer becomes more difficult. The responsibility for the working out of this problem largely rests upon the shoulders of the traveling engineer. He has a knowledge of the local situation, a knowledge of men and a knowledge of results that should place him in the front ranks of the advisers of the operating officers. It is with his loyalty, his intelligence and through the proper administration of his duties that a railway can be considered well or poorly operated.

Speaking more especially to the supplymen present Mr. Melcher said: "The railways are constantly confronted with the likelihood of a multitude of laws being placed upon the statute books which will affect their physical operation. Numbers of bills have been introduced into Congress and state legislatures having this in view. Some of these bills were introduced in such form as to favor special interests. In some cases, as drawn, they were wholly impractical, and in others wholly and unreasonably mandatory. Others, on the contrary, were commendable as to the objects sought to be obtained but introduced in such form as to prevent those objects being attained. About two years ago the railways appointed a committee to direct an effort to place before our legislators the exact facts as to what these bills meant and what effect they should have in modifying or changing existing railway practice.

The name which was chosen for this committee—The Special Committee on Relations of Railway Operation to Legislation is more suggestive of philosophical research, and points more toward enunciation of abstract principles than to the solution of any practical problems, but its duties are practical and

its work frank and open, and its progress marks the passing of old time methods. The sole purpose of this committee is to place the facts fully and correctly, and by experienced railway officers and employees, in the possession of those charged with responsibility for legislation.

In the prosecution of its work, the committee encountered activities of all kinds, both those of individuals and those of various associations; but in only two ways has it come into touch with such activities on the part of associations or of individuals engaged in the railway supply trade. The first of these was with relation to the Railway Business Association, of which George A. Post is the very able and active president. Without in any way sacrificing the interests of its members; nor those of the general public, that association has found it possible to strongly reinforce the protest against unscientific and unsound legislation, and contribute materially to a sane working out of the real problems presenting themselves.

The second point of contact was less agreeable, and I trust that you will not object to a frank expression in relation to one form of over zealous business enterprise, which at times makes it very difficult for all who are concerned in any way with the effects and results of legislation. We all admire a good salesman, but it is a serious question whether it is any part of good salesmanship to favor legislation for the purpose of making obligatory the use of a certain appliance, or even of a certain type of appliance, and it is regretted that there is evidence of a number of instances of legislation, fundamentally unsound, which as proposed provided an exclusive market for one device and deprived all competitors of that device of that market. Such cases naturally divide themselves into two classes: (1), where the appliances sought to be specified have not yet been thoroughly approved by the consensus of engineering opinion, and (2), those where the device may be standard, and is satisfactory, but presents no material advantages over other devices to accomplish the same result.

When the first class presents itself there is an opportunity for sympathy with the inventor who has such a thorough belief in his own invention that he feels that if the railways do not adopt it of their own accord that its use should be brought about by legislation. Support of this type of legislation is a commercial crime. Support of the second is open to objection that in the opinion of your customers such a course of procedure is poor business policy. There is little difficulty in meeting proposed legislation embraced in the first class, for no intelligent and conscientious legislator will stultify himself by voting for a measure after he has been shown by acknowledged experts on the subject that its efficiency is rather doubtful.

As to the legislation embraced in the second class: Opposition to it must rest upon the fundamental fact that as between two or more appliances, satisfactorily accomplishing the same purpose, the definite prescription of one must necessarily result in the gift of monopoly to its proprietor. This is a subject with which the various associations of supply men should deal themselves. They can deal with it to far better advantage than anyone else. Where such legislation is introduced it should be the duty of all supplymen to oppose it as far as consistent with good citizenship.

I have in mind an instance of a broad minded action in this matter by a large concern. When legislation was introduced in a certain state legislature, which would result in the adoption of its device, it published to the people of the state in the most public manner its frank opinion that railways should not be injured by unnecessary and burdensome legislation, and should be permitted to work out their own problems in respect to these matters, and publicly announced its deprecation of methods tending to compel the use of a device against the judgment and ability of the railways. It frankly relied upon the merit of its device to make it attractive to the railways and to find a market therefor.

MALLET COMPOUND IN ROAD SERVICE.

J. B. Daugherty (B. & O.) presented a paper on this subject of which the following is an abstract:

Baltimore & Ohio.—The Baltimore & Ohio Mallet locomotive No. 2400 was put into regular helper service on the Connellsville division. From January 6, 1905, to and including September, 1909, the locomotive made 113,956 miles, the major portion of which was in helping service between Rockwood and Sand Patch. During this period it received classified repairs as follows: Class 4, F. T., Connellsville, February 15, 1906; class 3, Connellsville, June 7, 1907; class 4, F. T., Connellsville, June 11, 1908. Shortly after September 30, 1909, it was shipped at the Riverside shop for class 3 repairs. During the period referred to above the locomotive was available for transportation use 33,459 hours, and unavailable 6,405 hours, or it was available for transportation use 84 per cent. of the time. The cost per 100 miles run for repairs, including running and classified, averaged \$9.04. The cost of operating this locomotive from the time it was put into service up to and including September 30, 1909, including repairs, fuel, supplies and in fact every item of expense entering into the operation and maintenance of the locomotive per 100 miles run, amounted to \$46.96, based on the actual mileage made by the locomotive during this period.

On February 20, 1906, it was used in road service with a view of making a test against two Class E-27 locomotives, with the same tonnage as handled by locomotive 2400. The results of the test were as follows:

	Two E-27	No. 2400
Number of cars	38	35
Tons	2,473	2,435
Actual running time	2 hrs. 45 min.	3 hrs. 43 min.
Coal consumed	30,000 lbs.	20,000 lbs.
Pounds of coal per locomotive mile	698	465
Pounds of coal per car mile	18,334	13,280
Pounds of coal per ton mile .....	.282	.191
Water consumed	19,200	15,700
Water evaporated per pound of coal	8 lbs.	6.05 lbs.

Locomotive 2400 used 25 per cent. more coal than one of the Class E-27 locomotives and 33½ per cent. less fuel than two E-27 locomotives. The lubrication of the Mallet locomotive compared with other locomotives in the same service for twelve hours was: Locomotive 2400, three pints valve oil, five pints car oil, one-half cup grease; cost, 32 cents. Two E-27 locomotives three pints valve oil, three pints car oil, one-fourth cup grease; cost, 27 cents.

We have experienced no trouble keeping firemen on locomotive 2400, as they are paid 25 cents per day more on this engine than on consolidation engines in the same service. Locomotive 2400 decreases rail and tie strain since it has but 11 ft. rigid wheel base, and can be handled over track where the heavy consolidation locomotives cannot be used. We have experienced no difficulty in keeping the flexible joints tight in the low pressure steam and exhaust pipe joints.

Chesapeake & Ohio.—The consumption of fuel by the Mallet compound locomotive equipped with a superheater is about one ton of coal less per trip than for an ordinary consolidation locomotive. The Mallet locomotive not equipped with a superheater consumed about one ton of fuel more than the consolidation locomotive. The average cost of lubrication on the Mallet, as compared with all other classes of locomotives, is about 50 per cent. greater on account of the large wearing surfaces. The average speed of the Mallet is about the same as that of consolidation locomotives; they are able to attain a speed of forty-five miles per hour. Firemen consider it less exertion to fire a Mallet locomotive than other classes of locomotives. Judging by the work that has been performed by Mallet locomotive 751, it will make the same mileage and handle 50 per cent. more tonnage than the consolidation locomotive between classified repairs.

Great Northern.—Tests were made on the Great Northern, where Mallet locomotives are in regular through freight service, between Minot and Williston, N. Dak. The division is 122 miles between terminals. Going west from Minot there is a

grade of .72 per cent. for a distance of thirteen miles, then a lighter grade of .5 per cent. for a distance of eight miles. The road from that point for a distance of seventy-five miles is what might be termed a rolling prairie with gradual ascending and descending grades; the last eighteen miles of the division have an ascending grade of .72 per cent. into Williston. The Mallets have 20 in. x 31 in. x 30 in. cylinders, 55 in. driving wheels, carry 210 lbs. steam pressure and are of the 2-6-6-2 type. During the summer months these locomotives are rated at 2,200 tons over this division.

The heaviest tonnage handled by the Mallet locomotive during the time of these tests was 1,615 tons in forty-four cars. With this tonnage it consumed one hour and 30 minutes in covering the first thirteen miles of .72 per cent. grade. From that point the grade is somewhat lighter, and the train arrived at Berthold, twenty-two and a half miles from Minot, in two hours and twenty minutes. From this point, as previously stated, the road is a gradual rolling prairie and the next twenty-four miles were covered in one hour and thirty minutes, arriving at Williston in eleven hours and twenty minutes from the time the train departed from Minot, including delays by meeting train and taking water and coal. The Mallet handled this tonnage over heavy grades with considerable less shock to draft rigging than the consolidation locomotive, because both units of the Mallet never slip at the same time and the slack of the train does not run up as in the case of a consolidation locomotive when slipping on a heavy grade. For this reason the Mallet is considered more reliable to handle tonnage over hard pulls than a consolidation locomotive. The speed of the Mallet will be materially reduced as soon as it strikes a slightly ascending grade, while the consolidation locomotive will go over the same grade at quite a high rate of speed. For this reason the consolidation locomotive will make considerably better time on a road which has broken grades. I am unable to give an accurate report as to the amount of coal consumed by the Mallet as compared with the consolidation, but from what I was able to observe while riding these engines I have come to the conclusion that the Mallet type will burn a little more coal per engine mile than the consolidation, but figuring on a 1,000-ton-mile basis, the Mallet will show considerable saving. The Mallet uses about again as much lubrication as the consolidation.

DISCUSSION.

On the Santa Fe, Mallets are being used in through freight service, and rather fast service at that. There is no reason why they cannot meet these conditions if properly designed for such service. The Santa Fe locomotives are of the 2-6-6-2 type and have 69-in. drivers. Any new type of locomotive is expensive to maintain until the men become familiar with maintaining and repairing the details.

Mr. Roesch spent 30 days on the division of the Santa Fe upon which they are used. He had been badly prejudiced against them, but was thoroughly converted. In one instance he was on a Mallet pulling 60 loads with a tonnage of 2300. It went over the division of 102 miles, and as no locomotive was available was forced to go right on over the next division of 98 miles, and then the next one of 108 miles. In all 308 miles were covered in less than 15 hrs., all delays included. The average speed of these locomotives over a division of .6 per cent. is from 25 to 29 miles per hour, although much higher speeds are attained—as high as 45 miles per hour. Every convenience is provided for the enginemen, including air operated fire doors, bell ringers, reverse levers and cylinder cocks; also coal passers. No trouble is experienced with break-in-twos and the trains get under headway quickly.

W. F. Walsh (C. & O.) was enthusiastic over the results being obtained from the Mallets in road service. They are handling all classes of freight and are of the 2-6-6-2 type with 56-in. drivers and 22 in. x 32 in. x 35 in. cylinders. There are economical both in fuel and maintainance as compared to the consolidation locomotives. A train of 2961 tons was hauled over a

77-mile division in 3 hr. 8 mins. The first 32 miles had a rise of 22 ft. to the mile; the next 17 miles 30 ft. to the mile; the next 17 miles a down grade of 60 ft. to the mile; the remaining 11 miles were rolling.

The opinion seemed to be that Mallets could be used to splendid advantage in road service if specially designed for it.

LUBRICATION OF LOCOMOTIVES USING SUPERHEATED STEAM.

Committee:—M. H. Haig (Santa Fe), chairman; W. O. Taylor (Gal. Sig. Oil); F. W. Edwards (Ohio Inj.); A. Maynes (Can. Pac.); S. Beidelman (C. R. I. & P.).

The effect of superheat upon lubrication depends on the temperature of the superheated steam. The smoke-box type provides for superheating from 30 to 80 or 90 deg. Fahr. above the temperature of the saturated steam, while smoke-tube superheaters have in some cases produced over 300 deg. Fahr. of superheat. Conditions attending the use of low and high superheat will be considered separately.

LOW SUPERHEAT.

Steam temperatures reported to the committee by the roads using smoke-box superheaters do not exceed 490 deg. Fahr. At the temperature obtained with smoke-box superheaters little trouble has been experienced from the use of the same methods of lubrication as employed on saturated steam locomotives and practically no changes have been made. Oil is being delivered to the center of the steam chest for slide valves and inside admission piston valves. Where outside admission piston valves are used the oil is introduced into the ends of the valve chamber. In some cases the cylinders have been tapped to receive direct lubrication at a point in the middle of the bore and near the top. Experience with this method, however, in some instances has led to the belief that as good results would be obtained by the usual method of feeding all the oil to the steam chest. All roads report having found it unnecessary to change the quality of oil with the application of low degree superheat. The oil in use has a flash point of about 520 deg. Fahr. There has been but little increase in oil allowance attributable to low superheat. Very little data has been received showing the effect of low degree superheat on the wear of valve and cylinder packing rings. No case has been brought to the attention of the committee where any change of material from that used with saturated steam has been found necessary. In some cases the wear appears to be a little more rapid. No change in the material of the rod packing has been made.

HIGH SUPERHEAT.

Eight roads have reported the use of smoke-tube superheaters, the superheat obtained varying from 100 to 200 deg. Fahr., with corresponding steam temperatures of 490 to 580 deg. Fahr. Other than increasing the quantity of oil used with either saturated or superheated steam, high boiler pressure has no effect upon lubrication.

Methods of Lubrication.—There are several methods of introducing oil to the valves and cylinders. Two roads consider it necessary to introduce part of the oil directly into the cylinders. Others with engines so equipped have found it unnecessary to use the cylinder feed continuously, but retain it as a precaution against cutting cylinders in emergency. This is deemed desirable, as oil will reach the piston rings with less delay than when introduced through the valve chamber, especially when the engine is drifting. In providing for direct lubrication of the cylinders, it is the practice of the roads reporting to introduce oil in the middle of the piston travel and as near to the top center line of the cylinder as the construction will permit.

Satisfactory results are obtained by the use of the following methods of feeding oil to the steam chest. They all apply to inside admission piston valves. (a) Two feeds per steam chest, one delivering oil near each admission port, preferably a little

toward the center of steam chest from the ports. This is effected in two ways: by a lubricator feed for each point of delivery, or by two lubricator feeds and oil pipes branched near the steam chests. (b) The customary one feed per steam chest, introducing the oil into the center of steam chamber. (c) One feed per steam chest, introducing oil into the steam channel at a point near the steam chest. (d) Three feeds per steam chest, one in the center of the steam chamber and one at each end near the admission ports. Each point of delivery has an individual lubricator feed. The road using this method makes no provision for direct lubrication of the cylinders. The use of graphite is reported by one road. In addition to valve chamber and cylinder oil pipes, Campbell graphite cups are piped to the relief valves of a number of engines.

To insure proper lubrication at all times, it is recommended by some that steam be admitted to the cylinders when drifting. It has been found that even though proper lubrication is obtained while working steam, the valves and cylinder walls become dry after drifting for some time. A drifting valve will let sufficient steam into the valve chambers and cylinders, if properly handled by the engineer. It is reported that by proper care on the part of the engineer in always opening the drifting valve before closing the throttle it is possible to obtain a material increase in life of packing rings. One road connects the drifting valve to the superheater, passing the steam through the superheater before delivering it to the cylinders and reports very satisfactory results. Several roads have made use of mechanical feed lubricators with superheated steam, but it has not proved as satisfactory as the hydrostatic type and its use has been abandoned for the latter.

D. R. McBain, superintendent of motive power, Lake Shore & Michigan Southern, has devised and patented a means of insuring uniform delivery of oil to the steam chest of engines using superheated steam. It is used in connection with the hydrostatic lubricator. Dry steam is led from the boiler through a 1¼-in. pipe to a valve which is so arranged as to be opened by the throttle lever. When open, steam passes through two ¾-in. copper pipes directly into the steam chest oil pipes, just ahead of the choke plugs at the lubricator end of the pipes. The steam-chest choke plugs are drilled out to the full size of the oil pipes, ¾ in. in diameter. By this means there is a constant flow of steam through the oil pipes to the steam chest, insuring a constant and uniform delivery of the oil.

Lubricant.—Several grades of valve oil are used on locomotives equipped with high degree superheaters. Flash points of 550 to 600 deg. Fahr. have been reported, but in most cases the same quality is provided for saturated steam locomotives that is now used with superheated steam.

High superheat has increased the quantity of oil used on valves and cylinders. The amount of this increase varies in different cases from 10 and 20 to 100 per cent. The larger percentages reported are due to the delivery of oil directly to the cylinders without a reduction in the quantity fed to the steam chest. In these cases the question of minimum oil consumption has not been extensively considered. The purpose has been to use a liberal amount of oil rather than to risk trouble from insufficient lubrication. The following statement was made by one who has had wide experience with highly superheated steam: "We are running about the same mileage on superheated steam engines as on saturated steam for valve oil, but I consider that the superheated steam engine should be given 10 to 20 per cent. more oil than the saturated."

Packing Rings.—The wear of cylinder packing rings is increased by the use of highly superheater steam. Introducing oil directly into the cylinders has not overcome this condition. The use of special material for packing rings has been attended with good results. The difference in wear of valve packing rings and valve chambers bushings is less noticeable. Piston rod packing has been very little affected by the use of superheated steam.

General.—A few precautions should be observed in connection

with the installing and operation of hydrostatic lubricators. Oil pipes from the lubricator to the valve chambers should be absolutely steam tight to insure the delivery of oil to the proper place. Care should be taken that the lubricator pipes slope toward the cylinders on an even incline throughout their entire length. To prevent the pipes being distorted they should be protected by placing them under the boiler jacket. The steam pipe from the boiler to the lubricator should be of ample size to insure full boiler pressure at the lubricator. It is desirable to start the lubricator from fifteen to twenty minutes before leaving time. It is reasonably certain where this is done that the valves and cylinders will be receiving oil when the engine is started.

Conclusions.—All information on lubrication of locomotives received from various sources agrees so closely on the principal points, that the committee feels justified in the following conclusions:

1. The conditions affecting lubrication are practically unchanged by the degree of superheat commonly obtained from smoke-box superheaters.
2. The flash point of valve oil should be higher than the temperature to which it will be subjected at the point where lubrication is to be effected. Oils now available fulfill this condition, and if delivered to the proper surfaces will lubricate satisfactorily.
3. The hydrostatic lubricator meets the requirements of proper oil delivery. It is considered more satisfactory than the mechanical feed lubricator because of absence of moving parts to wear and get out of order.
4. The life of common gray iron packing rings is too short to commend this material for use with high degree superheat.

DISCUSSION.

F. P. Roesch (El Paso & S. W.) thought that too much attention was paid to having the flash point of the oil above that of the temperature of the superheated steam. The oil cannot burn in the presence of steam, but vaporizes and thoroughly mingles with the steam. As the steam expands and the temperature goes down the oil will condense on the coolest spot in the cylinder, which will be the walls, or just where it is needed. The hydrostatic lubricator must be properly applied and maintained to be effective—too often it is unjustly blamed because of carelessness in its installation and operation.

H. Bentley (C. R. I. & P.) thought that the trouble experienced with the packing was due to the physical characteristics of the division on which the superheater engines were used. It had been his observation that on a level division where there was little opportunity of easing off on the throttle the trouble was far greater than on rolling divisions. A representative of the New York Central stated, however, that on a 135 mile run with a heavy train and a schedule of 60 miles an hour no trouble had been experienced with the packing rings, although there was practically no opportunity of the throttle being eased off, as the division was practically level.

Incidents were cited where a change in the material of the cylinder packing rings produced good results. The Pittsburgh & Lake Erie has a high degree superheater with slide valves. D. J. Redding, assistant superintendent motive power, believed that the lubrication difficulties were due to sudden shutting off the steam; he had found evidences of the oil being burnt when the engine came into the terminal station. He suggested an auxiliary steam line to the cylinders so that a small amount of steam could be introduced in the cylinders after the throttle had been closed, or else the application of larger relief valves. The discussion developed the fact that it is necessary to use a drifting valve when drifting, this valve being opened before the throttle is closed. It allows a small supply of steam to enter the cylinders through auxiliary pipes. The packing troubles can usually be traced to drifting or suddenly shutting off at high speed. Not much trouble, for instance, is experienced with low speed superheater freight engines.

It was stated that the Union Pacific had a superheater engine with slide valves, and that successful results were being gained by the use of bronze valves and valve seats. The C. & O. has 24 superheater Mallets which are used in through fast freight service. The oil is introduced directly into the steam pipe and also directly to the low pressure receiver. Schmidt superheaters are used and Galena superheater oil. The packing has not given any trouble. These engines have no drifting valves and drift down a 17 mile 1.3 per cent. grade at a speed limit of 20 miles per hour.

There seemed to be a more or less well defined opinion in the minds of some of the speakers that entirely too much oil is being used on superheater engines. The men in charge are not yet thoroughly acquainted with the performance of these engines and are afraid to take too many chances with them. As they become more familiar with them they will find it possible to get just as good results with much less oil than many are using at present. There seemed also to be a feeling that the oil pipe direct to the cylinder could be dispensed with. The tallow pipe connected directly to the steam passage in the cylinder saddle was very favorably spoken of.

THE TRAVELING ENGINEER AND HIS DUTIES.

T. A. Fogue, general mechanical superintendent, Minneapolis, St. Paul & Sault Ste. Marie made an address at the Thursday morning session in which he emphasized the importance of the work of the traveling engineer. He must be a man of superior qualifications in order to get the men under his direction to secure the highest possible efficiency from the locomotives which they operate. While important improvements have been made in locomotive design, all tending to increase the efficiency, there are still a great many of the older locomotives in service and the traveling engineer is looked to to see that the maximum efficiency is obtained from them and that proper use is made of the improvements on the newer locomotives.

One of the greatest problems before the traveling engineer is fuel economy, and also in some districts the elimination of black smoke. These go hand in hand, for a clear stack usually indicates good combustion, and it should be obtained as far as possible in the interests of economy, as well as for the prevention of smoke. The man factor is of course the most important one, but in addition close attention should be paid to the mechanical appliances. For instance, in many cases the draft appliances are poorly adapted not only to the local conditions, but to successful running as well. The traveling engineer is responsible for this condition.

Lubrication should not be stinted and more oil is required as the capacity of the locomotive increases, but this should not excuse carelessness on the part of the enginemen, or the use of improperly constructed oil cans. The hiring of wipers should be watched closely with the idea in mind that they must make the future engineers and special attention should be made to start the firemen in right from the very beginning. First impressions count for a great deal. The traveling engineer can be an important factor in assisting in the determination of the most economical tonnage ratings because of his knowledge and study of the locomotives in service.

He should instruct the men in the proper manner of making accurate work reports. The engine house foreman will be far more interested in seeing that the repairs are properly made if their reports are accurate and specific. It is not to be wondered at if he becomes disgusted when, after pulling a heavy piston rod, he finds that the trouble is with the valve. The traveling engineer should supplement his reports to his superiors with any good suggestion which may occur to him for the good of the service, even if not strictly in the line of his duties. The financial outlay due to providing and maintaining air brakes is surprisingly large, and to secure the most effective results from

their use the work of the air brake instructor should be ably seconded by the traveling engineer.

An improvement of from 7,000 to 60,000 miles per engine failure on Mr. Foque's road during the past few years has been due to the work of the traveling engineers, and care has been taken not to hamper them in their work in any way. The engineers must be carefully trained and instructed to take advantage of improvements which are being introduced.

EFFICIENT HANDLING OF ELECTRIC LOCOMOTIVES.

S. A. Bickford, of the New York Central & Hudson River, presented a paper on this subject, of which the following is an abstract:

It will take the same average type of man to successfully handle the electric locomotive that we find in steam service, and when electric locomotives displace steam, good results may be obtained by placing the steam locomotive engineers under competent instructors and educating them to handle the electric equipment. Their practical training in handling trains, coupled with previous knowledge of the physical characteristics of the territory over which the trains are to be moved, make them the best available material to educate for the new conditions. The study of the electric locomotive opens up as wide a field of investigation as does the steam locomotive, although we are perhaps safe in conceding that some fields of investigation are not so essential or necessary to make him proficient in his profession, since the generating of power on the steam locomotive comes directly under the supervision of the engineer in charge, which is not true with electric traction. Efficiency in handling locomotives means the ability to handle trains safely with a minimum of cost and delay.

It is not necessary to say anything here about stopping trains handled by electric locomotives since the same devices are used that are standard on steam road equipment. The starting devices, however, are different and certain economies have a direct relation to the method of handling these devices. On steam locomotives the throttle permits of a gradual opening of steam passages from boiler to cylinder when starting, and all the energy taken from the boiler passes through the cylinders. On electric locomotives, "rheostats" or resistance grids are placed in the motor circuit when starting to give the throttling effect above referred to. These rheostats prevent a sudden rush of power to the motors, but at the same time dissipate or give off energy in the form of heat. This is a direct loss. The control of speed of electric locomotives is by means of a controller, which turns on or shuts off the power; by closing or opening some form of switch usually called a contractor, it makes the various motor combinations and cuts the resistance either in or out of the motor circuit. These controllers are semi-automatic and will permit of improper handling on the part of the engineer. A large percentage of failures, resulting in train delays and damage to equipment, are "man failures," due to improper handling of controllers and failure to observe definite instructions.

In accelerating, several things must be kept in mind by the engineer. He must start without damaging the trailing load or inconveniencing passengers, if handling passenger trains. He must prevent damage from overheating of rheostats as well as wasteful dissipation of power. To do this, if schedules will permit, the controller handle should be left in the first running position until such speed has been attained as will permit of making the next motor combination and stepping out of resistance or rheostats without damage due to overheating, and thus prevent unnecessary drawbar strains.

The handling of the controller has a direct bearing upon the question of economy from the maintenance standpoint. The braking of heavy currents frequently burns contractor tips and in some cases makes short circuits that cause serious delays to train service and damage to equipment. The engineer who appreciates the possibilities and opportunities to make for him-

self a reputation by keeping the number of his train delays to a minimum will give the handling of the controller his closest attention and study.

The steam locomotive engineer sees the rapidly diminishing coal pile, and the fear that the water supply may fail serves to remind him of the necessity for care and close attention in the use of these supplies. On electric locomotives the source of power may be far removed and the evidence of wastefulness not apparent unless special attention be given to this matter. The source of greatest loss is the consumption of power without any actual work being performed. In accelerating trains, the speed attained may be such that to continue with the controller handle in that position, the locomotive or train would exceed time table or speed restrictions. Under these conditions frequently the controller handle is moved to the next highest running position and the speed at that time may be very much higher than could be attained had the controller handle been placed in the latter position at the start. Under these conditions all current drawn is absolute waste until the deceleration of train has reached a point where speed becomes constant due to torque on the motors; this may be for several miles. All electric equipment drifts much more freely than does steam, since there are no reciprocating parts or pistons to form vacuums to assist in checking speed; on the contrary, heavy armatures rotating at high speed act as fly-wheels and assist in driving the train at high speeds even when no power is being used. The controller handle should always be moved to off or closed position when it is desired to reduce speed, and not opened until the deceleration of the train has reached a point where it will be necessary to use power to keep the speed constant.

TREATED WATER.

Committee.—A. G. Kinyon (Hanna Stoker Co.), Harry Bentley (C. R. I. & P.), A. M. Bickel (L. S. & M. S.), Frank Hopper (C. R. I. & P.) and John Roddy (D. D. & C. Wks.)

The committee presented an extensive report outlining the different classes of impure water and the troubles caused by them. In considering the effect of scale on heat transmission it said: Attention is called to the results of thoroughly reliable and authoritative tests made under practical operating conditions for the determination of the loss of efficiency due to scale formation of different thicknesses and physical properties.

Character of Scale.	Thickness.	Composition.	Percentage of Loss.
Hard.....	1/50 of an inch.....	Mostly carbonate.....	9.4
Soft.....	1/32 of an inch.....	Mostly carbonate.....	7.2
Hard.....	1/32 of an inch.....	Mostly carbonate.....	8.5
Soft.....	1/25 of an inch.....	Mostly carbonate.....	8.0
Hard.....	1/25 of an inch.....	Mostly sulphate.....	9.3
Hard.....	1/20 of an inch.....	Mostly sulphate.....	11.1
Soft.....	1/16 of an inch.....	Mostly sulphate.....	10.8
Soft.....	1/16 of an inch.....	Mostly carbonate.....	11.0
Soft.....	1/16 of an inch.....	Mostly carbonate.....	12.4
Hard.....	1/16 of an inch.....	Mostly carbonate.....	12.6
Soft.....	1/11 of an inch.....	Mostly carbonate.....	15.0
Hard.....	1/9 of an inch.....	Mostly sulphate.....	15.9

It is not always the composition of the scale that has to do with the loss, it being more dependent upon the physical conditions. It will also be noted that the last case mentioned is quoted as hard, 1-9-in. thick, composed principally of sulphate of lime, showing a loss of 15.9 per cent. of efficiency. From this, together with other data which has been accumulated, it has been concluded (1) that considering a scale of ordinary thickness, varying up to 1/8 in., the loss in heat transmission due to scale may vary from a very insignificant amount to as much as 10 to 12 per cent.; (2) the loss increases somewhat with the thickness of the scale; (3) that the mechanical structure of the scale is of as much or more importance than the thickness in producing this loss; (4) that the chemical composition, except in so far as it affects the structure of the scale, has no direct influence on its heat-transmitting qualities.

The committee sent out a circular of inquiry, and the remainder of the report is largely taken up by a consideration of the replies which were received. The conditions are so different

on the various roads and it is so plainly evident that each case needs special and expert attention that it is difficult to draw any definite conclusions from the data received from the different roads.

Discussion.—There was considerable discussion, largely due to a request on the part of some members for information as to the merits of treating plants vs. treatment in the tender tank. Nothing conclusive was developed.

THE BRICK ARCH.

Committee:—W. G. Tawse (Loco. Sup. Co.), J. A. Cooper (Erie), J. J. Butler (C. & A.), S. D. Wright (C. of Ga.), and V. C. Randolph (Erie).

The design and construction of the brick arch today is the result of several years of close study, painstaking investigations and experiments by men of large experience in locomotive operation, resulting in eliminating the objections that have heretofore existed against the brick arch. The most noticeable improvement in brick arch construction is the sectional arch, the brick being made of small units, so that certain sections can be removed for flue work and staybolt inspection, without interfering with the other portions of the arch, resulting in the saving of the arch and of time due to installing a new arch.

Other things being equal, the brick arch adds to the boiler capacity by making each square foot of heating surface count for more steam. This because of the fact that the firebox temperatures are always found to be increased by the installation of the brick arch. The brick arch adds to the firebox capacity and the fireman's capacity, because the more complete combustion forces each pound of coal to yield a higher percentage of its total heat units. It saves coal because of the better combustion and because of the baffling and retaining effect on the gases and on the fine and light combustible matter, which otherwise would be drawn through the flues in the form of sparks or partly consumed coal.

The brick arch abates the smoke and cinder nuisance by more thorough combustion, due (1) to the better mixing effect of the gases and oxygen of the air drawn into the furnace chamber, and (2) that the longer flame travel gives more time for combustion to be completed before the gases pass into the tubes and are lost. The baffling effect on the cinders is a thing that can be determined, and numerous tests carefully conducted show a very marked decrease in cinder throwing due to it.

The brick arch affords a protection to the flues. This statement can be verified by inquiring of almost any one responsible for the up-keep of flues who has had opportunity to observe the difference in this respect between arch engines and no-arch engines. The result is due, no doubt, to the fact that wide and sudden variations in flue temperatures are prevented by the presence of the arch.

The reasons for a growing demand for brick arches are many, the principal ones being:

1. The growing demand for boiler capacity and fuel economy. This was met in years gone by with larger designs. There was plenty of room for growth in size and weight of boiler and plenty of margin in fireman capacity or endurance. Not so now. These limits are reached, hence the requirements such as brick arches, superheaters and other devices to further extend the capacity of the boiler.

2. The growing public sentiment and demand for economy in railway operation. The consumers of transportation are putting forth arguments for properly enforced methods of economy, hence any accessory that will yield a net saving of even 5 per cent. of a railway fuel bill cannot longer be ignored. A brick arch will give a net saving of from 5 to 15 per cent., depending upon the conditions of operation.

3. The growing public sentiment against the smoke and cinder nuisance. The time is drawing near when the public will de-

mand either the suppression of the smoke and cinder nuisance, or the suppression of the steam locomotives. The arch is recognized as one of the best smoke preventers and as one of the most efficient devices for reducing the quantity of sparks thrown from the stack, and on this account it becomes directly valuable as a fuel saver.

From the replies received it is quite evident that the nozzle tips can be opened up with the application of the brick arch. This is accounted for by a greater percentage of the gases from the coal being consumed; as the function of the brick arch is that of a mixer it brings about a more complete mingling of the gases, thereby aiding combustion, resulting in higher temperatures in the firebox. These claims have been fully sustained by many experiments made on different roads. Many of the replies are very flattering on the benefits derived from the use of the brick arch where water conditions are considered bad, the steam failures having been reduced from 50 to 75 per cent. Instances have been cited where locomotives arrived at terminals with flues leaking each trip without the arch (all are familiar with the excessive loss of fuel with leaking flues) and since the arch has been applied the same locomotives are now making several trips before flues need attention. These favorable results are due to the uniform degree of heat maintained in the firebox, and elimination of the cold air passing through the firebox door, being deflected by striking the arch before reaching the flues.

We do believe, that theoretically there should be no opening next to the flue sheet and that all the gases should be made to pass over the rear of the arch. In actual practice, however, there are localities in which conditions are such as to require clearance at the front, and our only recommendation in this regard would be to experiment with the arch tight to the flue sheet, bringing the drafting of the smoke box to favor it as much as possible, and if, after a thorough trial has been made, success is not met with, use a small spacer block on the tubes. A compromise may be effected by having the middle section tight to the sheet to protect the lower central flues, and the side courses set back to give clearance through which accumulations may be discharged to the grate. This is a question which will no doubt bring out some good discussion on the results of the location of the arch.

The hollow brick wall used on the Central of Georgia was also described (see *Railway Age Gazette*, August 5, 1910, page 225, for results which are being given by this device).

A test was recently made on the New York Central Lines with a wide firebox type of boiler to ascertain the efficiency of the brick arch and arch tubes. The boiler was equipped with four water bars 3 in. in diameter; 458 tubes, 15 ft. 6 in. x 2 in.; firebox length, 105 in.; width 75¼ in.; steam pressure 200 lbs. The evaporative power of the boiler is increased 14.9 per cent. by using the brick arch in the firebox. One-third of this increase is accredited to the water bars, while the remaining two-thirds must be due to the brick arch itself. The reason for this increase is perhaps the storage of heat in the brick arch at an advantageous place near the back flue sheet; the forcing of the path of the flame upward to the crown sheet and on through the upper flues, which are the best heating surfaces of the boiler, and keeping the flues clear of fuel. Without the brick arch, fuel is often thrown or carried by the draft into the lower flues, plugging them and thereby rendering these flues useless. It is very noticeable that there is a saving to the flues caused by the brick arch; for when the firebox doors are opened the in-rushing air must first come in contact with the hot arch and thereby become heated before reaching the flue sheet.

DISCUSSION.

The large switch engines on the Erie at Cleveland, Ohio, are fitted with brick arches which fit tight against the flue sheet and the side sheets. They have 4 arch tubes and 20 brick. Practically no trouble occurs from flues plugging up, although some ashes gather on the front end of the arch. Steam jets, induction tubes and small smoke doors in the fire doors have been used to prevent smoke, but the brick arch has done more to

eliminate it than all the other devices put together. According to the method of measuring smoke in Cleveland no objection is made if it amounts to less than 9 per cent. Switching locomotives with the brick arch average about $2\frac{1}{2}$ to 3 per cent. The arch also saves coal.

Tests on the Santa Fe show a fuel saving of from 11 to 14 per cent., with the brick arch. On the Atlantic Coast Line it was found possible to lengthen a run due to the introduction of the brick arch. George M. Carpenter (N. C. & St. L.), who has so strenuously opposed the Games hollow brick construction is now equally enthusiastic in favor of it.

The discussion brought out clearly that the proper location and arrangement of the brick arch depends largely on the quality of the fuel and the design of the firebox. Theoretically the arch should be against the flue sheet; in some cases it is possible to put it there; in other cases the brick can be placed against it at the center and openings can be left at the corners; in still other cases the arch must be kept entirely away from the flue sheet. The tendency of the gases is to follow the path of least resistance and when an arch is not used the back sheet and the back end of the side and crown sheets are not as effective as they might be. The brick arch, deflecting the gases, makes these parts more effective and thus makes it possible to secure maximum efficiency from every square foot of firebox heating surface. Tests of different length brick arches show that the elimination of black smoke and the decrease in flue troubles is directly proportional to the length of the arch.

EFFICIENT MANAGEMENT.

Samuel O. Dunn, editorial director of the *Railway Age Gazette* made an address at the Friday morning session in which he said:

Your association exists, and you are met here, for a serious and important purpose. That purpose is the exchange of ideas and experience, and the inspection of the fine exhibit our railway supply friends have provided, with the object of better enabling yourselves to aid in keeping down or reducing the cost and improving the quality of the transportation rendered by the railways of the United States to the public. In other words, you are here to help increase the scientific management of railways. These words recently have been much used in a different sense. They have been employed to designate a special way of training, directing and compensating labor, which is believed by its advocates to promote economy. Now, I have no quarrel with the efficiency engineers. Many of them have done, are doing, and will do good work. But this use of the words "scientific management" is inaccurate, unfair, objectionable. It incorrectly implies that there is no scientific management where the particular principles and methods advocated by certain efficiency engineers do not obtain. Scientific management is the skillful adaptation of means to ends. It is any method by which the best results are secured from the use of money, men, materials, equipment, or structures. Mr. Randolph told you the other day how on a single division of the Erie there was saved in 1910 over \$30,000 in fuel, and in three months in 1911 over \$28,000. Any means by which such results are secured are scientific, whether so called or not. Year by year the unit costs of materials and labor on our railways have increased. In spite of that the service rendered has improved, and its cost to the public has declined. Mr. Kruttschnitt has shown that during the fifteen years from 1894 to 1909 the prices of commodities and the wages of labor increased an average of 30 per cent., while railway rates remained stationary, and that because, by efficient methods, railway managers prevented the prices of transportation from rising in proportion to the cost of labor and commodities, the people of the United States were saved in those years \$7,144,343,000 in transportation charges. This is one-half as much as the net capitalization of our railways. These enormous results were obtained by the increasingly

efficient use of money, men, materials, equipment and structures; in other words, by scientific management, using those words in their broad and proper sense.

It is largely through the work of such organizations as yours that the operation of American railways has been so improved. Your association is one of the answers to the charge that our railways are not operated with sufficient regard to efficiency. Other similar answers are the American Railway Association, the Master Mechanics' Association, the Master Car Builders' Association, the American Railway Engineering Association, the Association of Transportation and Car Accounting Officers, the Railway Signal Association, the Bridge and Building Association, etc. These organizations exist to study means of making each dollar of operating expenses do more and better work, or of getting the same results with fewer dollars. That so many railway officers are active in their labors shows there is no want of zeal among them for economy and efficiency. That the executive officers give their subordinates time and encouragement to do committee work and to attend these conventions shows both their interest in the increase of efficiency and their appreciation of the value of organized effort. There are more active hard-working organizations that exist solely to promote efficiency connected with the railway business of the United States than have ever been associated with any other industry in the world. Many persons who question if the railways are well run, would not do so if they knew something of the untiring, splendid labors of this and other like associations. The railways of America are not operated with 100 per cent. efficiency; no class of concerns is; but largely through the work of your and similar organizations they have been, and are, contrary to an impression now prevalent, probably the most scientifically and efficiently conducted large enterprise in any country on earth.

It was because railway men knew how much they had been doing as individuals and organizations to effect economy, and at the same time give the public better service that they so warmly resented the imputation that they did not know and were not properly conducting their business. When they thought of the grades that had been reduced, of the curvature that had been eliminated, of the additions that had been made to the tractive power of engines and the capacity of cars, of the increases in the average car and train load, of the improvements in the speed and comfort of passenger service, they naturally were indignant. Subsequent developments illustrate the character of those who manage our railways. They have usually been willing to listen to anyone who thought he could suggest a way to make ninety-nine cents do work that previously had required a dollar, or to make two passengers or two tons of freight grow where one grew before. They have not cared much whether the suggestion came from a hostile or a friendly critic, if it was good. So in this case the railway managers at once energetically set about to find how much truth there might be in Mr. Brandeis' accusation, and what further economies could be effected without impairing the service to the public. The past two decades have been a period of big things in American railways. When attention is fixed on big things the smaller ones are apt to be neglected. Government regulation of railways and an adverse money market having put the soft pedal on big things for a while, railway men have had more time to give attention to these smaller things; and they have found there are opportunities for effecting numerous small economies which amount in the aggregate to large sums. They are not saving a million dollars a day yet. It will be a long time before they can do it without heavy reductions in wages, or serious deterioration of the properties, or serious impairment of their public service. But in consequence of the increased attention that is being paid to the little things it is probable our railways are now being more economically run than ever before.

There remain many further economies—some of them large ones—that may be effected, not only in the handling of labor, but in the use of fuel, in the use of the telegraph, in the disposition

of scrap, in the handling of freight to reduce loss and damage, and in a hundred other ways; and the future well-being of our transportation lines and all connected with them will depend much on the practice of reasonable economy in small as well as large things. To the men composing such organizations as yours the managers must look to devise means for doing many of these things. The efficiency engineers have their place. They can offer many useful criticisms and suggestions. But to the men who have had the hard experience of practical work, and who are having it now, the roads must look for practical results.

When the many efficiency methods that are being worked out by individual railway officers and by your and other organizations, shall result in lower costs of operation in future, as they have in the past, who is to get the benefits? The theory of many is that railway net earnings should be limited to a certain arbitrary percentage, and that if, by increasing the efficiency of its operations, a road succeeds in earning more, its profits should be curtailed by reducing its freight and passenger rates. But can there be any justice or consistency in saying to the railways, as the Interstate Commerce Commission did, that they must get such additional money as they need by increasing the efficiency of their operations, and then adding that if they do thus increase their net revenues they will be partially or wholly deprived of the increase by reductions in their rates? The man who made efficiency famous, Mr. Brandeis, recognized the injustice and inconsistency of that. I will read to you a statement that he made not long since while testifying before the Railroad Securities Commission. It has not been as widely quoted as his statement that the railways could save \$1,000,000 per day; but it contains more truth.

"Today efficiency in management is in danger," said Mr. Brandeis, "of being punished, whereas it should be rewarded. Efficiency is naturally reflected in large net earnings; and as no ready means exist for determining whether greater net earnings are due to greater efficiency in management, or to higher rates, large earnings are frequently accepted as evidence that rates are too high, and invite a demand for reduction; whereas, in fact, the large earnings may be due wholly to better judgment, greater efficiency, and economy in administration. To take from railway corporations the natural fruits of efficiency—that is, greater money rewards—must create a sense of injustice suffered, which paralyzes effort, invites inefficiency, and produces slipshod management."

Why this policy must have these results is plain. As Mr. Melcher said, the other day, "The traveling engineers are the points of contact of the operating organizations through which the effort for mechanical efficiency and operating economy is conveyed to the men who physically move the traffic. They supervise personally and directly the man behind the gun." Now, you strive constantly to increase the efficiency and economy with which engines are run, not only because you are loyal to your employers, but because you hope and expect by doing so to earn recognition and advancement for yourselves. Your superior officers press you to do your work better, because they hope and expect thereby to secure recognition and promotion for themselves. The owners of the railways similarly take the risks of investment and improvements and extensions, because they hope thereby to get larger profits. But if the owners did not profit by the results of their enterprise, they would have no incentive to insist upon better and better management. In that case they would have no incentive to reward the managers in proportion to the results they got, and the managers would have no incentive to reward you in proportion to the results you got. No one would then have any incentive to strive to promote efficiency. It would be banished from the railway world. There is no efficiency where there are no rewards for efficiency.

The railways in certain sections of the country are now in process of being partially deprived of what Mr. Brandeis called the "natural fruits of efficiency—that is, greater money rewards." To that is due to no small degree certain unfavorable business

conditions which persist. I believe, however, that these conditions are but temporary. The public better understands now than it has in the past the conditions and the needs of the railways. It is coming to recognize the fact that the laborer in the transportation vineyard as well as elsewhere is worthy of his hire, and must get it if he is to continue to do good work. There remains yet a good deal of educating—educating in which not only all who are connected with the railways, but in which all who are connected with the supply concerns which have provided the splendid exhibits that we see outside, may wisely participate. If this be well done, public opinion will become more tolerant of railway shortcomings, more appreciative of the good qualities of railway management and more disposed to see all those who are entitled to them receive what Mr. Brandeis truly called "the natural fruits of efficiency—that is, greater money rewards."

AUTOMATIC STOKERS.

J. R. Luckey presented an extensive report on this subject from which the following is taken:

There is now a most gratifying prospect confronting us. Three stokers are what we might term "making good." The large number of replies received from members not having stokers on their roads, and the comparatively few able to tell anything regarding the three machines now under discussion, is an indication that experiments as yet are still confined to a narrow scope; but the building of a few more of the same kind for each road is a most healthy indication, and the extension to a wider field is but a question of time. One stoker of the under-feed type and two of the steam-blast principle will be discussed in this paper.

Crawford Under-Feed Stoker.—In response to the circular I received the following from D. F. Crawford, general superintendent of motive power, Pennsylvania Lines West of Pittsburgh: "We have in use an under-feed type of locomotive stoker and conveyor. The locomotives equipped with stokers have been daily hauling their full capacity and full tonnage, no exception being made between a locomotive equipped with a stoker and one of the same class without. The subject of fuel economy is now under investigation; complete data is not at hand. None of the locomotives equipped with stokers have been provided with brick arches. We have not experienced any trouble with blowing fuel into the flues. We have no record showing that there has been any increase or decrease in flue work due to the use of the stoker. Smoke has been abated to the extent that it has been practically eliminated. Average readings made at the locomotive testing plant show the smoke to be about .4 to .5 of the Ringelman No. 1 chart. This would be about 10 per cent. of total blackness—this being the average reading for a long run. When the stoker is operating the combustion is practically smokeless, but when work is being done on the fire, such as hooking or shaking the grates, smoke of the No. 1 and No. 2 chart is produced for about 20 to 30 seconds. Tests are now being made on the reduction in sparks discharged from the stack. When the stokers were first put on the road, a regular crew followed them up. Now the locomotives equipped with stokers are in the pool, with a fireman instructor to instruct the various crews in the operation of the stoker. With the design of stoker we have in use, stoker and hand-firing may be done at the same time, as there is nothing in the cab to interfere with firing directly through the fire-door. After an operation covering over one year, we have not had any serious delays to trains. As the stoker and conveyor handle all the fuel, the labor of handling coal on the part of the fireman is entirely eliminated. The stoker is built into the locomotive, and does not in any way interfere with the employees. Accurate tests are being made at the locomotive testing plant at this time on the evaporative efficiency. We are using run-of-mine coal, which is being used by all locomotives on our lines. About the same depth of fire

is carried with the stoker as with hand-firing; the depth increases with the length of time the locomotive is on the road. It is not necessary either with hand or stoker-fired locomotives to remove clinkers in the middle of any division."

Then follows a detail description of the Crawford stoker (*Railway Age Gazette*, June 10, 1911, page 1411). A record of seven engines, making 773 separate trips with a total of about 50,000 train mileage, gives an average percentage of stoker work of 92.1 and 67 per cent. perfect trips.

Discussion.—Unfortunately there seemed to be no one present who had had any experience with the Crawford stoker. A letter was read from Mr. Crawford, calling attention to an erroneous statement made by the writer of the paper and stating that the stoker handled successfully any grade of run-of-mine coal, although some difficulty had been experienced with coking coals. Tests of a 4-6-2 locomotive on the Pennsylvania Lines West equipped with one of these stokers showed that it consumed less coal per unit of work than when the most skillful hand-firing was used.

Hanna Stoker.—The Hanna locomotive stoker has been developed during tests covering a period of six or seven years, mostly on the Queen & Crescent. During the past year the workings of this machine have been so satisfactory, both on simple consolidation and Mallet compound locomotives as to awaken deep interest. Results of a series of comparative fuel tests for the C. N. O. & T. P., made by the college of mechanical and electrical engineering, State University of Kentucky, Lexington, show that using coal without the stoker at \$1.35 per ton, and coal with the stoker at 90 cents per ton, the cost per 100 ton-miles without the stoker is \$1.26 and with stoker 88 cents. Saving, 30.3 per cent. Then follows a detailed description of the construction and operation of the Hanna stoker (*Railway Age Gazette*, July 14, 1911, page 85).

Discussion.—F. P. Roesch (El Paso & S. W.) stated that he had investigated the work of this stoker on the Santa Fe, but that he did not find it satisfactory, although he frankly admitted that the conditions were very much against it. In the first place the coal was not satisfactory. On the early part of the run it had to be broken up before it could be used; on the latter part slack was furnished, but of a peculiar grade with which the representative of the stoker company was not familiar. It is difficult to draft the Mallets to get an equal distribution of the draft, and this means careful handling of the stoker. His objections to the stoker were that all of the grate could not be seen without disconnecting the upper part of the hopper or conveyor, which takes time. He believed, however, that this objection could be eliminated. The deck had been cut away to install the stoker, making it awkward for the enginemen, although this could probably have been avoided. The fuel consumption per unit of work was considerably higher than the average for the month of all hand-fired locomotives on the division. When necessary to resort to hand firing the top of the hopper is removed, but although the remaining portion is not very high, still it is directly in front of the fire door, and therefore in the way and somewhat awkward.

G. F. Meredith (C. C. & O.) stated that a Hanna stoker on one of their Mallet locomotives in pool service had given splendid satisfaction, being far more economical, as concerns fuel consumption, than the best hand firing. Black smoke is also reduced. A light fire is carried and the rake is seldom used. The stoker can fire up successfully at the engine house.

A representative of the Great Northern said that that road had tried a Hanna stoker, but had had to discard it because of the difficulty in securing suitable coal, run-of-mine only being used on that road. He also criticised the small peep hole, which does not allow the entire grate to be seen. This latter objection can, however, be overcome, if necessary.

A. G. Kinyon, a representative of the Hanna stoker, called attention to the necessity of properly drafting the Mallets when the stoker is used. His observation has been that in hand firing

most of the coal is burned on the front half of the grate. With the stoker the coal should be burned evenly over the entire grate area. The use of the stoker cuts down the flue troubles.

Street Stoker.—D. R. McBain, superintendent motive power, L. S. & M. S., in replying to the circular of inquiry said: "The Lake Shore has made a very thorough test of the Strouse and Street stokers on class G-46 engines. The performance of the Strouse stoker was not satisfactory and it has been taken out of service. The Street stoker was designed to handle run-of-mine or slack coal in any proportion from the tender to the firebox, crushing and distributing it uniformly over the grate surface; also to permit free access to fire doors for putting in coal with the shovel, using the rake, or getting into the firebox at terminals without removing any of the parts. Its design permits of 100 per cent. firing with the stoker or part firing by hand, if so desired. The first Street stoker was applied to engine 5883, class G-46, consolidation, 23 x 30 in., April 14, 1909. Expected mechanical weaknesses were found in the first experimental stoker. The principle was so satisfactory as to justify the building of an improved machine, which was applied to the same engine May 27, 1910. This latter stoker has been in regular pool service up to the present time, between Ashtabula and Youngstown, and pusher service on the hill from Ashtabula to Carson.

"The improved design of the Street stoker was later applied to three of our G-5, 23 x 32 in. consolidation locomotives. These are in regular pool service on slow and fast freight between Collinwood and West Seneca. It is possible to work the locomotives to their full capacity with the stoker. Have not been able to effect any definite economy in fuel. No trouble from honeycomb. There is no noticeable difference in the saving of work on flues and side sheets. The amount of black smoke emitted is constant for heavy firing, though it is possible to overload the firebox with this stoker as with hand firing; where ordinary judgment is exercised it is possible to get results equal to hand firing. As the coal is crushed to small particles, the sparks and cinders are about the same with the stoker as without. In installing the stoker we assigned a regular crew and a certain machinist, in most cases, to look after the repairs. There was also a special representative of the stoker company with the engine.

"As this stoker is designed to permit of part hand firing, if necessary, and the doors are also unobstructed, the fireman may immediately proceed to hand fire. In case of a stoker break down, it is only necessary to shut off one throttle valve each for the elevator engine and the stoker engine. We have had no delay to trains due to the Street stoker, but have had to hand fire. While the fireman is required to feed coal into the crusher constantly when the locomotive is working to maximum capacity, his labor is reduced to scraping coal into the crusher opening. In my opinion the fireman's labor is reduced perhaps 25 per cent. It is not necessary to disconnect any part of the stoker for the work mentioned, or ordinary work at terminals. No tests have been conducted to determine evaporative efficiency. The cost of preparing the coal is the same as for hand firing, except for the cost of the crusher which is provided with the stoker and is an auxiliary equipment. Somewhat lighter fire might be carried with the stoker, but we have no data regarding this. We have not noticed any difference in clinkering, etc."

Then follows a detail description of the construction and operation of the Street stoker (*Railway Age Gazette*, May 26, 1911, page 1196).

Discussion.—F. P. Roesch had also investigated the work of this stoker on the Santa Fe. He did not find it as economical as hand firing. In his opinion it reduced the work of the fireman 75 per cent. instead of 25 per cent., as suggested by Mr. McBain; the tendency on the part of the fireman was therefore to fire too heavy and waste the coal. The stoker did not appear to have absolute control of the distribution, although this could undoubtedly be remedied. The fire door was not disturbed

by the application of the stoker and the entire grate surface could therefore be seen and the fire could be raked or hand fired without loss of time. He also criticised the amount of space occupied by the stoker, the large number of parts due to the addition of the crusher and the conveyor and the noise made by the operation of the stoker. The stoker will handle any kind of coal and a fireman should be able to learn to operate it in one trip. Mr. Street said in reply he had never considered the stoker on the Santa Fe a success, because of the difficulty in securing a representative to see to its proper installation.

A representative of the L. E. A. & W., said that a Street stoker had been in successful operation on that road for 1½ years. Four breakdowns had occurred to the conveyor, but there had been no delay to the trains.

The C. & O. has two of these stokers in service, and is buying two more. It permits the locomotives to be worked to their full capacity. The engines are in pool service and are used in either freight or passenger service. After a fireman has made two or three trips with the stoker he is able to spend from 50 to 75 per cent. of his time on the seat box.

J. R. Scott (St. L. & S. F.) said that one of their Mallets was equipped with a Street stoker. It was assigned to a regular crew and gave excellent service. If however, it was necessary to change crews trouble usually occurred on the first trip and it became necessary to clean the fire on the road. The reason was that a crew unfamiliar with its operation pushed the fire too hard. To get the best results it was necessary to practically starve the fire, i. e., to keep it so thin that the grates could be seen. The crusher had given trouble a couple of times by getting a block of wood or iron in it. It did not break, but it was a little difficult to remove the obstruction. The stoker made considerable noise. When standing still it was best to hand fire, as the stoker was not properly adjusted for such work. On long curves the tendency was to distribute the coal more heavily on one side than on the other.

Clement F. Street said that changes were being made to overcome the unequal distribution on curves. Excellent results are being obtained from the stoker on the Pennsylvania. The engineer is held responsible for its care on that road with beneficial results. Of 125 runs between Harrisburg and Altoona all but 3 were 100 per cent. stoker fired. Changes in design are being made which will largely eliminate the noise. It is easy to design a stoker for high speed service; the difficult problem is to handle the slow drag service. It is hardly fair to judge the stoker by comparison with expert hand firing. Rather should it be compared with the average hand firing. The stoker fired engine gets no mercy and the locomotive can be worked to its full capacity.

Strouse Stoker.—J. J. Hannahan, a representative of the Strouse stoker, said that two of their stokers were in pool service on the C. & A., one on a Mikado superheater locomotive. They are giving good results. This type of stoker is being perfected and will shortly be heard from in no uncertain terms.

OTHER BUSINESS.

Subjects for 1912.—The committee on subjects suggested eleven subjects for 1912. These were referred to the executive committee with the recommendation that a selection be made from them and that fewer reports be arranged for next year. In almost every case this year the discussions had to be "choked off," in order to get through the work of the convention in four days.

Report of Delegate to M. M. Association.—C. F. Richardson, the retiring president in 1910, was unable to represent the association at the Master Mechanics' convention at Atlantic City last June, and W. C. Hayes (Erie) was delegated to do so. He presented a detailed report of the proceedings, emphasizing those features which are of special interest to the traveling engineers.

Election of Officers.—The following officers were elected for 1911-12: President, W. C. Hayes, Erie; first vice-president,

W. H. Corbett, Erie; second vice-president, F. P. Roesch, El Paso & Southwestern; third vice-president, John McManamy, Pere Marquette; secretary, W. O. Thompson, N. Y. C. & H. R. R.; treasurer, C. B. Conger, Wm. Sellers & Co.; executive committee, F. C. Thayer, Southern; V. C. Randolph, Erie, and J. C. Petty, N. C. & St. L.; executive committee, short term, Robert Collett, Frisco.

Place of Meeting.—The southern members made a strong plea for the 1912 meeting. As a result Atlanta, Ga., received 71 votes, Chicago 53, and Washington, D. C., 10. There seemed to be a strong feeling on the part of many that Chicago being more central and having had the most successful meeting in the history of the association should be again selected. The executive committee will select one of the three cities, Atlanta, being given the preference if conditions will warrant.

Changes in Constitution.—The fiscal year will close August 1 instead of August 15. An associate member of one year's standing can make application for active membership. The president must be selected from a man in active railway service and holding the position of road foreman of engines, or a position ranking above it. The secretary can pass on the applications for associate membership.

Examination Questions.—A standing committee will be appointed to revise these, as it may become necessary.

Suppliesmen's Election.—The Traveling Engineer's Suppliesmen's Association elected the following officers: President, J. Will Johnson, Pyle National Headlight Company, Chicago; secretary, W. L. Allison, Franklin Railway Supply Company, Chicago; treasurer, Frank D. Fenn, Crane Company, Chicago; executive committee: W. J. Schlacks, McCord & Company, Chicago; Frank H. Clark, The Watson-Stillman Company, New York; P. H. Stack, Galena Signal Oil Company, St. Paul, Minn.

FOREIGN RAILWAY NOTES.

The Prussian state railways for the first four months of their fiscal year, show an increase of 5.2 per cent. in passenger earnings and of 8.4 per cent. in freight earnings. The expenses are not reported till the end of the year.

The employees of the Hungarian state railways had their pay raised on May 1, after years of struggling, which at times was pretty near fighting. They are divided into nine classes. The president now receives \$3,000 a year; six directors, \$2,400 each; 7 vice-directors, \$2,000; 8 superintendents, \$1,800; 115 engineers, \$1,000; 430 other engineers, \$760; 559 engineers of a still lower class, \$580; the three lowest classes, designated only as "employees," \$400, \$360 and \$320. The total number of all classes is 6,039. These are the permanent staff. Probably as many more are employed as laborers, etc., who may be discharged when not needed.

On the island of Formosa there are now 273 miles of government lines, 360 miles of private lines, and 450 miles of push-car lines, a total of 1,083 miles. The western side of the island, from Tamsui in the north to Takow near the south end, has a good railway service, with many private lines connecting with the government road. The latter it is proposed to extend to Nanwan. The opening up of the eastern side, which is very mountainous and inhabited by savages in the northern part, has necessarily been slow. The government line runs south from Keelung through Taihoku, the capital, as does the Tamsui branch from the northwestern port. There are also push-car, or hand-car, lines on the east side, and the government proposes building from Tui to So-o and thence to Kwareuko. From Kwareuko south the government now operates 11 miles, and for 91 miles farther south traffic is handled on push-car lines. The government expects to have a standard-gage road built to Pinan by 1914 and will later build to the southern end of the island and connect up with the line along the western side.

CONCRETE PILES FOR BRIDGE FOUNDATIONS

One pier and one abutment of the new Kentucky & Indiana bridge over the Ohio river at Louisville, Ky. (*Railway Age Gazette*, August 4, page 208), are supported on concrete piles. The other foundations for this bridge are carried down to rock, but in these two cases the depth to rock was too great to permit this. The soil is a hard clay and when dry has sufficient bearing power to support the loads for which the footings of the mass piers and abutments were designed. At high water the soil under the shore pier on the Kentucky side and under the abutment on the Indiana side is kept wet, with the result that its bearing power is greatly reduced. In order to prevent any

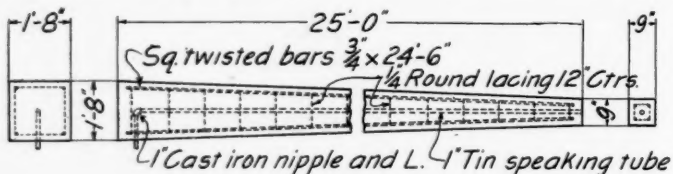


Fig. 1—Piles Arranged for Jetting to Place.

chance of failure under these conditions, and in accordance with the general policy of making every part of the structure as permanent as possible, it was decided to support these two footings on concrete piles.

The shore pier on the Kentucky side is at a point near which borings had shown the soil to be sandy and rock to be at a depth of about 65 ft. The pier footing is about 21 ft. x 62 ft., and 83 piles were used, spaced 3 ft. center to center in both directions. On the assumption that the driving was to be through sandy soil, a 1-in. tin speaking tube was imbedded in the concrete longitudinally through the center of the pile for use in jetting the piles to place. The upper end of this tube was connected by a nipple to a cast iron angle extending outside the pile, as shown in Fig. 1. The lower end of the pile was made square to insure straight driving. The reinforcement was four 3/4-in. twisted bars tied with 1/4-in. bars on 12-in. centers. The piles were 25 ft. long, 20 in. square at the top and 9 in. square at the bottom. In driving piles for this pier it was found that a pocket of clay underlay the site and it was impossible to use the jet on account of the rapidity with which the tube was stopped with clay. They were driven to place by a Warrington steam hammer having a 3,000-lb. striking weight and a stroke of 30 in. After driving several piles the adjacent clay became so compacted that in some cases it required 5,000 blows to drive 20 ft. The piles stood this extreme treatment remarkably well,

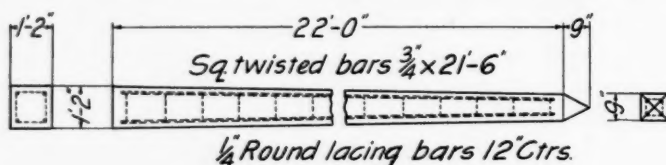


Fig. 2—Piles Arranged for Driving.

only 18 being broken, and in all these cases the crushing extended only about 18 in. below the top. Ordinary steam hammer leads were used for directing the driving, and a wrought iron hood was arranged to travel in the leads and contain the necessary cushion over the head of the pile. This hood was made in two pieces bolted together through the flanges, as shown in Fig. 2. Channels were riveted on the outside of this hood, providing the necessary clearance to allow it to travel in the channels on the inner sides of the leads. A number of experiments were made on cushions for these piles, and the type which was finally developed proved much better than anything else that was tried. Three cement bags full of coarse sawdust were placed directly on the head of the pile, which was allowed to extend several inches up into the hood. Over these sacks of sawdust was placed

a block of beechwood 24 in. long, which extended above the upper end of the hood and received the blows of the hammer. Beech proved better than any other wood for this purpose, as it satisfactorily cushioned the blow, yet was not seriously injured by the treatment. The bags of sawdust proved effective in preventing shattering of the heads of the piles, and were necessary, as in some cases where the bags were not used or were filled with a fine grade of sawdust considerable shattering was noticed, which was apparently due to this cause alone. Driving the square-ended piles through the hard clay was so difficult that the last batch of piles for the pier footing was made with a pyramid point, which increased the number driven per day from three to nine.

The soil under the abutment was known to be stiff clay, and the design of the pile was altered somewhat in the light of the experience gained on the previous work. The depth to rock under the abutment was only a little over 20 ft., so it was decided to make the length of the piles 22 ft. and drive them to solid rock. All piles for this work were made with the 9-in. point, which was in addition to the 22 ft. of length. The batter of the piles was also reduced, using 14 in. square at the upper end and 9 in. square at the lower, as shown in Fig. 1. The same reinforcement was used as described above. This reinforcement was apparently ample, for there were no breakages that could be traced to a lack of reinforcement. Even better results might have been obtained, however, if a greater depth of concrete had been provided over the upper end of the reinforcing bars. If the concrete

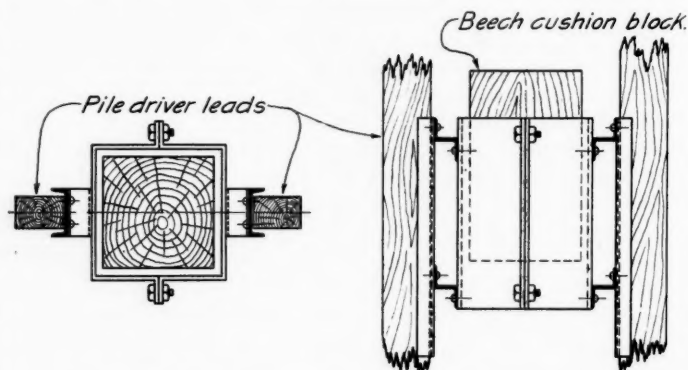


Fig. 3—Cast Iron Hood Used on Head of Concrete Piles.

above the bars is shattered off, the vibrations due to the driving are carried down through the pile and may result in serious damage. The progress in driving through the clay had been so slow that it was thought necessary to adopt some method of decreasing the time required for this work. After numerous suggestions had been tried, the following method was adopted and used with good results. Three men with a post hole augur bored 12-in. holes from 16 to 19 ft. deep in which to start the driving. Six men using two augurs were able to dig about 20 holes a day and keep ahead of the driving gang. A heavier steam hammer, having a striking weight of 6,000 lbs. with a stroke of 30 in., was substituted. In driving piles in augur holes, the pile was placed in the hole and the weight of the hammer allowed to rest on it before driving was started. This weight was usually sufficient to push the pile down from 8 to 11 ft. The leads were then shifted until the hood came over the top of the pile, and it was found necessary to have the leads exactly in line with the hole, for if the pile was strained to the leads the top was likely to crack badly. Out of 125 piles driven in this manner, only one was shattered enough to condemn it, and on only three was it necessary to cast new heads after driving. It was found that the driving had to be stopped at intervals to allow air and water in the augur holes to escape through the gravel which overlay the rock. If this was not done tremendous pressure was exerted by this compressed air and water. The depth to rock had been determined by soundings before the driving was begun, with the intention of stopping as soon as

piles struck the rock, but it proved very easy to tell when rock was reached by the sound of the hammer blow. The last few blows were usually light ones, as there was great danger of injuring the piles if many blows were struck after the rock was reached. It was possible to drive 15 to 18 piles a day in the auger holes under the body of the abutment, where they were spaced 3 ft. center to center on lines perpendicular to the face of the abutment. By taking advantage of the experience gained in this work, it was possible to drive fully 90 per cent. of the piles without a crack, and the 10 per cent. were cracked only about 12 in. from the top.

The piles were cast on molding boards convenient to the point where they were to be driven, and allowed to cure on these boards for 30 days before driving. The concrete used was a 1:2:4 mixture, using 1½-in. stone. The cost of making the piles averaged about 50 cents a lineal foot, and of driving about 30 cents, making the total cost of the piles in place about 80 cents a lineal foot. This work was done under the direction of W. M. Mitchell, general manager and chief engineer of the Kentucky & Indiana Terminal Railroad. The Foster Creighton Gould Company was the contractor, Wilbur Creighton being superintendent in charge.

LETTERS FROM AN OLD RAILWAY OFFICIAL TO HIS SON, A GENERAL MANAGER.*

XV.

LOS ANGELES, Cal., July 15, 1911.

MY DEAR BOY:—How many miles of road should one division superintendent handle? Like the old lady's recipe for pie crust, it all depends. Some superintendents in the east with two hundred miles handle as much business as do their western brothers with a thousand. As a matter of fact, mileage has little to do with the question. On the ideal division the superintendent is in the middle with territory extending one freight district in each direction. If he happens to be at a hub he can comfortably handle several freight district spokes, which will increase his mileage accordingly. Under such a condition the advantages of a seemingly large mileage are numerous. The superintendent can run his power wherever most needed. He can hold back at the farther end of one district cars that he knows the connecting district cannot possibly load or unload for several days. He can preserve a balance which is impossible when jurisdictions divide at the hub. In the latter case each superintendent hurries freight to the end of the division to avoid a paper record showing delay on his territory. The result is that the next man has terminal indigestion because he has been fed too fast. Therefore, divisional jurisdiction should, when possible, change at an outlying district terminal away from a large city. This avoids the added complication due to industrial switching, suburban trains, restricted area, etc., etc. A congestion of cars is often caused by a congestion of jurisdictions. You may avoid the one by diffusing the other. Several roads in the country could have saved heavy expenditures for larger terminal facilities by more scientific organizations.

The amount of mileage a superintendent can economically handle depends, then, for the most part upon the location of his headquarters. Such location in turn admits of no hard and fast rule. Cities and towns spring up and industries develop quite regardless of the limits of a hundred-mile freight district and a speed of ten miles per hour on the ruling grade. A railway usually begins and ends at a large city which is either a seaport or a gateway. It is normally better to locate a division superintendent at such beginning and ending city. He can then handle its terminals and the one or more diverging freight districts. His division should include the terminal at the farther end of such districts, to afford him opportunity both to hold back stuff whose inopportune arrival might congest the more complicated terminals at headquarters and to relieve such term-

inals promptly by movement outward. In other words, owing to his important terminals this superintendent should have less mileage than his country brother who would be in the middle between the second and third districts.

Some roads try to solve the problem by giving the superintendent the first and second districts with headquarters in the middle. If in such case the general offices happen to be at the initial point they soon ignore the superintendent and do business direct with his terminal subordinates. When this condition becomes intolerable, one of two things usually happens. Perhaps the superintendent's office is moved to the first terminal where it really belongs. Thereupon he loses full touch with his freight crews on the second district, which is left out in the air. The other attempted remedy is to appoint a superintendent of terminals reporting direct to the general offices. The difference in viewpoint thus legalized may cost the stockholders much money. To the terminal superintendent the trains are always made up on time and the power and road crews are seldom ready. To the division superintendent the trains are seldom made up on time and the power and road crews are always ready. Much energy of both officials and their offices as well as that of the general superintendent and his office is then directed to holding useless post mortems and negotiating unnecessary treaties of peace. Remember, my boy, that typewriters exert no tractive power and explanations move no cars. Self-preservation is the first law of nature. We must so organize that this law will operate to keep the company into clear, not to put some other fellow in the hole. All of these questions are largely matters of opinion. After working with every kind of terminal organization all over the country, your old Dad believes that the best is to have a division superintendent at the big terminal with an assistant superintendent in direct charge of and responsible for such terminal, the superintendent controlling every diverging freight district to include the next terminal.

It should always be remembered that a large terminal demands preferred consideration, because owing to restricted area its problems are intensive and expensive. A dispatcher has a hundred miles or more over which to keep his trains apart, while a yardmaster finds his engines bunched within a mile or two. Again, if the cost of terminal switching does occasionally happen to be reflected in a freight rate, the genial gentlemen of the traffic department are prone to recommend its absorption. I believe as a broad proposition that the management of railways is more scientific than that of most modern industries. I would not like, however, to file much of their terminal operation as an exhibit. A majority of the switch engines in the United States have one superfluous man in the crew. This is partly because so few operating officials have sufficient practical knowledge of switching to go out and intelligently handle a crew all day. If you don't believe this, make some time and motion studies of switching. Compare the relative performance of your yard conductors. The tasks of road conductors are relatively so well defined that comparison of individual performance is not so difficult. The intense conditions of a terminal complicate such differentiation as among yard conductors.

Another factor of prime importance in determining the size of an operating division is the location of train dispatchers. The dispatcher's table should always be considered an integral part of the superintendent's headquarters offices. The train sheet is perhaps the best record on a railway. It is never fudged by being made up in advance. It is a history usually unimpeachable because it is so close to the actual transactions which it records. It deals with the essence of railway operation, train movement. Few are the important records on a railway that do not derive their primary data from the train sheet. The sheet may be graphic, like a daily time card chart, or may be cut up into card strips, as under the A B C system. In any form, it is a fundamental of operating history.

The number of dispatchers to which a division is limited is, like the number of miles, a variable. With headquarters at the hub, one superintendent and one chief dispatcher may com-

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fortably handle three or four sets of dispatchers. An outlying division with thin traffic may require only one set of dispatchers. When it becomes necessary to locate a set of dispatchers away from division headquarters, it is time to appoint another superintendent and create a new division, perhaps with only a light staff of all 'round officials. So important is the train sheet and so much of vital, human interest centers around a dispatcher's office, that the far away superintendent must refer much correspondence to this detached portion of his office. The result is expensive circumlocution and a lack of human touch. The superintendent has in effect become a general superintendent too far away from real things. A trainmaster or a chief dispatcher is really carrying the responsibility of a superintendent without the title and authority necessary for smooth administration. I know several railways that are fooling themselves into the belief that they are saving money by having one superintendent for two dispatching offices. One of them has five superintendents and ten dispatching offices, really ten divisions in fact, if not in name. By a logical arrangement of territory these ten dispatching offices could be consolidated into seven division headquarters and the road operated in seven divisions. In these days of overtime and complex working schedules, a timekeeper should check the time slips against the original train sheet, not against a copy, a transcript or an excerpt. A division accounting bureau handling all that it should handle has also much other use for the train sheet.

Second only in importance to the train sheet as a record, and with which it should be closely related, is the conductor's car and tonnage report; what the men call the wheel report. This important report made by a division man is sent to a remote general office in disregard of the responsible head of such division, the superintendent. The result is that a distant authority, the superintendent of transportation, is telling the superintendent that certain cars are being delayed on the latter's division. This profuse correspondence is often foolish, because meantime the cars have actually gone. Some roads now have a carbon copy of the wheel report made for the use of the accounting department. Why not send this carbon to division headquarters and let the division accounting bureau make up the ton miles and the car miles, subject to proper check after the fact? Why not have the office of the superintendent know so much about the cars on his division that he will tell the general offices that certain cars are being delayed on his division for lack of motive power, loading or disposition, conditions which, perhaps, the general office, with its larger view, can remedy? This would also permit, when desirable, the checking of the agents' car reports against the conductors' reports. The more closely to actual transactions we can do our checking the more intelligent should be the process and the smaller its volume.

I wish that you would come out here and see the Southern Pacific run its monthly supply, pay and inspection train. Before coming, re-read my letter to you on the subject some seven years ago. I know of no place where the idea has been better carried out. Ideas seldom originate with any one man. They seem rather to float around in the air. They are pulled down by those who happen to erect lightning rods or like Benjamin Franklin to fly kites. To vary the metaphor, do not laugh at people who ride hobbies. Sometimes they ride well enough and far enough to demonstrate that the hobby is a real horse. Then it is the turn of the horse to laugh.

Whenever I see an announcement that a division has adopted the telephone for train dispatching, I always feel that there should be an accompanying apology for being several years behind the times. For years progressive young railway men advocated the telephone only to be assured by old-time dispatcher officials of the unwisdom of such a course. Time and practical tests have shown that not only is the telephone practicable for dispatching, but it actually makes operation safer because of the increased human touch. Whenever and wherever we can replace a specialist with an all 'round man we are gaining.

The first train dispatching is said to have been done by Charles

Minot when a superintendent on the Erie in the early fifties. So seriously was the matter taken that only the superintendent himself could issue a train order, even though this involved calling him out of bed. Hence the foolish, feudal custom of signing the superintendent's initials to all train orders. It soon developed that a regular dispatcher was necessary. Accordingly, a conductor, a man who knew how trains were practically handled, was taken off the road and brought to the superintendent's office to dispatch trains. Stop off at Port Jervis, N. Y., some time and in a local hotel see the portraits of some of these old Erie dispatcher-conductors, their dignity being protected by the tall beaver hats of the period. The dispatcher not being a telegrapher, he wrote out his orders and handed them to a young operator to send. This operator was a bright fellow, who, by and by, graduated into a dispatcher, able to send his own orders and often to do the work previously requiring both men. Too often it has happened that the experience of the new dispatcher, a telegrapher specialist, was limited to the office end, with no first-hand experience in train service. The telephone, fulfilling the immutable laws of evolution, will take us back to first principles. The dispatchers of the future will graduate from the train, engine and yard service, through the dispatcher's office to higher official positions. The man who gives the order will be a man who has once carried out such an order himself. The man below will obey the more cheerfully and the more intelligently because of increased confidence in the man above.

When the record is made up by the future historian, with that discriminating perspective which time alone can give, high will be the place accorded the railway officials and employees of America. The military, the pioneers of civilization, the fore-runners of stability, have their periods of enervating peace. Transportation, the first handmaiden of progress, is in active attendance every day of the year. Those who worship at her shrine and follow her teachings must lead the strenuous life and love the voice of duty. The splendid, virile performance of the past, handicapped often by crude facilities and forced expansion, must and will be eclipsed under the intense, trying conditions of the present and the future. In no profession more than in ours is there eternity of opportunity.

Affectionately, your own

D. A. D.

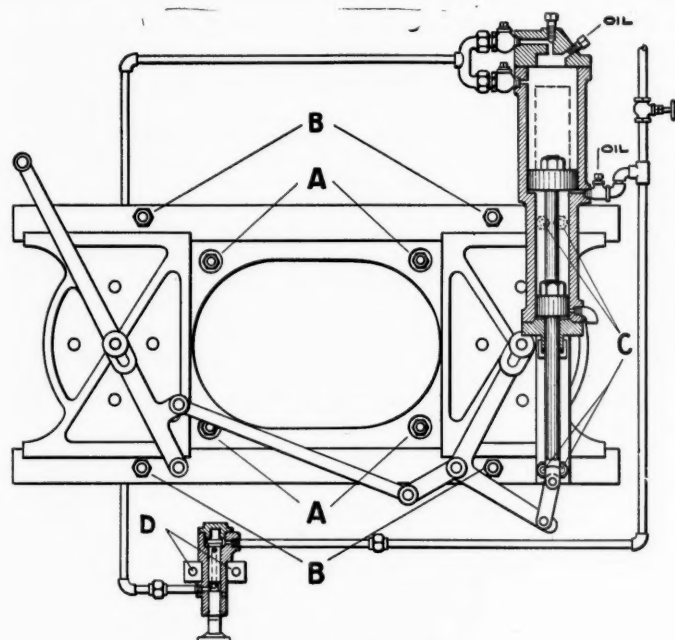
TELEPHONE INSPECTORS.

On the Canadian Pacific we have one telephone inspector for 250 to 300 miles of circuit with his headquarters approximately in the center. We have not found it necessary to provide motor cars, but I believe that every inspector should have a light motor car, particularly where there are few trains. Our inspectors are supposed to be continually on the move. I consider that an inspector's duty is not so much to remove interruptions, as to prevent them occurring.—*W. J. Camp* (C. P. R.).

China has now a total of about 5,404 miles of railway in operation, or almost completed. Of the railway lines in actual operation, 2,433 miles are in Manchuria, and about two-thirds of these are Japanese or Russian. There is in course of construction a total of about 1,702 miles, some of which will probably not be completed for several years. There is projected, with more or less definite plans of construction, surveyed or unsurveyed, authorized by the Chinese government or not, a total of 13,434 miles. Construction during 1910 added rather less than 500 miles to the railways of the empire. Nor is the prospect for 1911 much more promising, since almost no new enterprises have been undertaken. While plans for new railways in China are numerous, actual development is proceeding slowly. The Imperial decree declaring the nationalization of Chinese railways and the completion of the loan agreement toward the construction of the Hankow-Szechuan system in defiance of provincial opposition mark a very definite advance toward the resumption on a large scale of railway building.

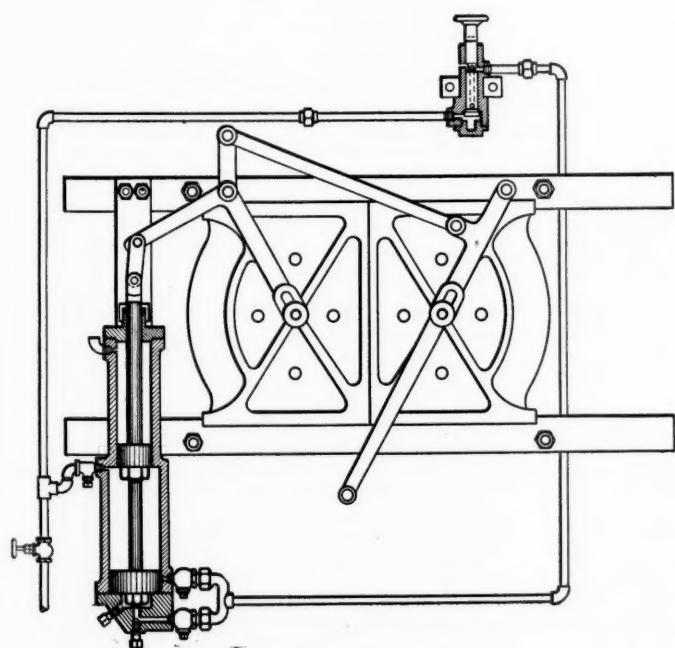
AUTOMATIC FIRE DOOR FOR LOCOMOTIVES.

The Shoemaker automatic fire door for locomotives illustrated herewith, has been redesigned to prevent a wasteful leakage of air past the two piston heads which operate the doors. The makers—the National Railway Devices Company, Chicago—claim



Shoemaker Fire Door; Open.

that the parts which have heretofore rendered the door inoperative on account of intense heat have been eliminated, and that the air containing parts are sufficiently removed from the door opening to avoid trouble due to the extreme heat. In the Shoemaker air cylinder, the differential idea which has been so successfully embodied in the construction of the locomotive air



Shoemaker Fire Door; Closed.

pump, has been used, and with it the up-stroke of the piston or the door-closing movement is automatic. The doors are locked shut by air in their closed position, which prevents them from working open when the locomotive passes over sharp curves.

The piston down-stroke or door-opening movement is secured by applying the air to the upper side of the large piston head by means of a foot valve. In both up and down strokes, the piston action is automatically cushioned, relieving the jar on the doors, lever pins, levers and the cylinder itself.

The two illustrations show the fire door open and closed. The door ring is attached to the locomotive boiler by the studs *A*. The door guides are bolted to the door-ring by stud-bolts *B*, and an upright plate, to which the air cylinder is fastened, is attached to the right hand ends by bolts *C*. The foot-valve, which is operated by a pedal, is fastened to the end of boiler by the stud-bolts *D*, which are the only additional holes necessary to be made in boiler other than required for the swing door. It will be seen from the illustrations that the fire door is composed of two distinct and self-contained mechanisms, each possible to operate entirely independent of the other. These may be properly designated as door parts and air parts. The operation of the former, when disconnected from the latter by the removal of a pin joining the fulcrum lever arm to the piston, is by a hand operating lever.

CABLE RAILWAYS IN AFRICA.

The Schume, Schagai and Megamba forests, in German West Africa, are at an altitude of about 4,920 ft. above the sea. To bring them into communication with the Usambara Railway, which runs through the Pangain plain, the only feasible method was a cable railway. The firm of Wilkins & Wiese, which has a concession for exploiting these forests, contracted with the firm of Ad. Bleichert & Co. in Leipzig, Germany, to construct this road. The preliminary work was finished in 1906, but then difficulties on every side commenced. The road is now in operation for a length of 6 miles, rising in this distance 4,920 ft. It is in three sections, each with a completely independent endless cable. The first section extends from New Hornow to Corner Station No. 1. The section from New Hornow to the foot of the mountains was built on a steep grade. To accomplish this it was necessary to build a large power station, but from the crest of the ridge down to corner station No. 1, the weight of the logs is sufficient to bring down the cars and to furnish considerable surplus of power for producing electric light and power in New Hornow.

In order to get the power which was necessary for the first ascent, it was necessary to bring up a very powerful stationary engine, but the transportation of this machine on African roads from Mombo over the William valley to New Hornow, about 35 miles, caused the principal delay in the construction of the road. Two or three Europeans and more than 100 negroes worked seven months long at this. The boiler was fastened on a railway car and then run along on rails that were continually laid down, taken up and laid down again further on, until the top of the mountain was reached. According to the difficulties encountered, the advance made each day varied from 100 to 1,000 yds. It was necessary to build bridges, widen roads and blast rocks, and all along there was danger of letting the whole thing fall into the abyss. Between corner stations 1 and 2 there were reaches of about 1,000 yds. of cables without intermediate support. These required very strong towers at each end. The latter are of iron, 100 ft. high, and might be said to be stuck on to the side of the mountain. No piece of these towers could weigh more than the usual load—66 lbs.—for a native bearer. Each one had to be carried up along special paths cut for this purpose; and the same was the case with casks of cement, and all other building materials. From corner station 2 to the unloading station, Mkumbara on the Usambara Railway, the fall is comparatively slight. From this point the logs can be loaded easily on the cars. The entire run of 6 miles is made in an hour. Down grade, the maximum load is ten tons; up grade, only one ton. The heaviest piece that may be taken is 1,760 lbs., which is divided between two cars.

General News Section.

At Buffalo, N. Y., last week two Pullman porters were arrested on charges of having committed serious thefts from the baggage of passengers.

At Parame, France, September 4, R. G. Garros soared in an aeroplane to a height of 13,945 ft., nearly half a mile higher than the best previous record.

The Southern Pacific hospital at San Francisco has received from Mrs. E. H. Harriman a gift of \$50,000, with which to establish a bacteriological laboratory.

The shops of the Pennsylvania at Pitcairn, near Pittsburgh, are now working at full capacity, over 300 men having been hired within the last three weeks.

On the Atchison, Topeka & Santa Fe lines in California, eleven passenger conductors have been discharged for the reason, it is said, that they carried passengers on "short fares."

One of the features of the general retrenchment recently ordered on the Southern Pacific is the discharge or suspension of train auditors on some or all of the divisions where these auditors are employed.

The Indiana Railroad Commission has begun suit at Peru to prosecute the Wabash Railroad for violating the law which requires three men in each switching crew. It is complained that a certain crew has three men a part of the time, but that one of the men has also other duties to perform.

The Cunard steamship *Lusitania*, delayed in its westward journey last week because of the strike of dock laborers in England, lay at her dock in New York City only 32 hours and 10 minutes, returning to Liverpool at 6 o'clock Monday evening. During this time the vessel took aboard 5,500 tons of coal. Her last eastward cargo of freight was still in her hold. The officers having been unable to get men in Liverpool to unload it.

The State Board of Equalization of Idaho has made sweeping increases in the valuation of the railways of the state. The valuation of the main line of the Oregon Short Line is reported as \$26,028,090, as against \$7,155,720 last year; and other important sections of railway are assessed at sums more than two or three times as large as former assessments.

A southbound express train of the Southern Pacific was attacked by robbers about forty miles north of Redding, Cal., on the night of September 1, and two safes in the express car were blown open. The robbers had boarded the train at a station and the engineman was ignorant of their presence and did not stop until he heard the explosion in the express car. The robbers grasped what valuables they could and jumped off and escaped in the darkness as soon as the train stopped.

In connection with an exhibition of flying machines near Boston on Monday last, E. L. Ovington, flying in a Bleriot monoplane, made a flight of about 160 miles in 3 hours, 6 minutes, 23 seconds, actual time in motion. The flight was made from Boston northwest to Nashua; thence southwest to Worcester; thence southeast to Providence, and thence northeast to the starting point. Stops were made at each of the cities named, where fairs were in progress, attended by many thousands of spectators. Mr. Ovington received a prize of \$10,000 from the *Boston Globe*.

At Holly, Mich., on the Grand Trunk Railway a few weeks ago the engineman and fireman of a freight train were taken suddenly sick and were obliged to stop their train in the shortest possible time and get off the engine. They were picked up unconscious and, according to newspaper reports, they had been poisoned by drinking water from the tender. An officer of the road informs us that this supposition as to the cause of the sickness was erroneous. An examination by a physician led to the conclusion that the men had been poisoned by something which they had eaten at a station about 40 miles back.

The Frisco Refrigerator Line has been incorporated in Missouri, with a nominal capitalization, to engage in the refrigerator transportation business in connection with the St. Louis & San Francisco Railroad. It is planned to operate 2,500 refrigerator

cars, and the handling of all fruit and other commodities requiring refrigeration will be taken over by the new company. The incorporators are the following officers of the St. Louis & San Francisco: W. B. Biddle, vice-president; W. C. Nixon, vice-president and general manager, St. Louis; F. H. Hamilton, secretary-treasurer; B. W. Redfearn, general perishable freight agent, and F. H. Wood, general attorney.

A recent explanation of the plan adopted some years ago by the Illinois Central, of giving its employees a chance to buy stock in the company, states that an application blank, which is printed in triplicate, is furnished to any employee wishing to purchase a share. When he fills it out the blank is sent to the officer of the road on whose payroll his name is listed, and it is then sent to the office of the comptroller in Chicago, where the price is fixed on the share, based on the latest quotation on the New York stock market on the day of the receipt of the application. Deductions from his payrolls of \$5, or any multiple thereof, are authorized by the employee, and on completion of the payment a certificate registered in his name on the books of the company will be issued to him. He can then start to make payments on a second share.

The Pennsylvania is renewing its lectures on "First Aid to the Injured," and has notified employees that the interest taken by them in the subject will be one of the elements of their qualifications to be considered when they are up for promotion. During the last three years the medical officers of the company have given lectures of this kind to over 15,000 employees. During the coming season the company intends to invite local city firemen and policemen to attend the lectures. In these lectures the men are taught not only how to carry an injured person on a stretcher, but they also receive instructions for taking primary care of wounds, fractures, burns, and shocks, without the use of drugs, until competent medical aid can be obtained. They are also instructed in the emergency treatment of pain, unconsciousness, convulsions, effects of heat and cold, and resuscitation from electric shock.

A meeting of members and representatives of the State Railway Commissions of Kansas, Oklahoma, Iowa, Wisconsin, New Jersey, South Dakota and Nebraska was held at Lincoln, Neb., August 29 and 30, for the purpose of forming a permanent organization to exchange information and secure uniform methods of physical valuation and accounting. The decision of Judge Sanborn in the Minnesota rate cases was denounced in resolutions as imperiling the usefulness of state commissions in regulating rates; and it was decided to appoint a committee to brief the arguments of the commissioners and present them to the United States Supreme Court at the hearing on appeal of the Minnesota cases. The representatives of the Wisconsin commission declined to sign the resolutions on the ground that he opposed organization among the states to co-operate in rate litigation cases or for other similar purposes.

The auditor of the Texas Railway Commission has compiled the following statement, comparing the revenues and expenses of the Texas railways during the fiscal year ended June 30, 1911, with those of the previous fiscal year:

	12 months ending June 30, 1911.	12 months ending June 30, 1910.	Increase. Inc.	Per Cent.
Freight revenue.....	\$65,877,387.36	\$64,512,685.90	\$1,364,701.46	2.12
Passenger train service.	30,645,031.00	28,225,473.35	2,419,557.65	8.57
Other revenue	1,774,586.73	1,643,491.77	131,094.96	7.98
Total operating rev...	\$98,297,005.09	\$94,381,651.02	\$3,915,354.07	4.15
Operating expenses ...	75,876,737.91	72,246,030.22	3,630,707.69	5.02
Income from operation	\$22,420,267.18	\$22,135,620.80	\$284,646.38	1.29

The Ohio state tax commission has fixed the value of the aggregate taxable property of the 102 railways in that state at \$573,234,249, this valuation being almost 250 per cent. in excess of the amount the same property was assessed for taxation last year. The total valuation of the different lines of the Pennsylvania system in the state is given at approximately \$183,823,675; of the New York Central, \$95,627,890, and of the Baltimore & Ohio, \$70,713,375. Several of the roads which protested against the tentative valuations that the tax commission placed on their

property some weeks ago, were given hearings and some changes have been made; and investigations into the valuations of a few of the smaller roads have not been completed.

Eureka!

In Boston, barrels of beer being brought from the brewery to the bar-room are no longer broken by bad bungling, but are allowed to bounce on bags of cork, the bag being laid on the sidewalk. A Boston boy, with brains, observing this beneficent practice, began boldly to suggest its applicability to the unloading of baggage. As skids are clumsy and troublesome, and their use can only be enforced by regular prodding, we endorse this Boston idea most warmly.

Telegraphing Around the World.

On Sunday evening, August 20, a telegram sent around the world by the *New York Times* made the circuit in 16 minutes, 30 seconds. The message, addressed to the *Times*, was sent from the telegraph room of that paper at 7:00 p. m., and it was received at the same office at 7:16:30. The aggregate length of lines traversed is said to have been 28,613 miles.

Mails by Freight Train.

The order of the second assistant postmaster general directing the shipment of monthly and semi-monthly magazines by freight train, which was noticed last week, page 444, provides for such shipments not only westward from Buffalo and Pittsburgh, but also eastward over the same routes, and in addition over the following routes: Canton, Ohio, to Chicago (for "To-Day's Magazine"); Cleveland to Chicago for the "Railroad Trainmen's Journal and the Locomotive Engineers' Journal"; from Rock Island, Ill.; to Chicago, Council Bluffs, Kansas City and St. Paul for "Modern Woodmen of the World"; and from Springfield, Ohio, to seven prominent cities, for "Woman's Home Companion."

The magazines are to be termed "Blue-tag matter," and blue tags will be attached to every sack. The order says that shipments must be made in carloads of 10 tons; and a postmaster having less than this quantity must hold it until he gets enough more to make the carload. Special bills of lading will be used, printed in green ink, and three copies must be made, one of which is to be sent to Washington. At Chicago the freight cars will be taken to the Union depot terminal; at Council Bluffs to the Union Pacific transfer, and at St. Louis to the Annex post office, at the Union station, Eighteenth street yard. The railways whose bids have been accepted will assume the cartage charges at points of shipment and at destination. The order gives the names of the transfer companies which have been engaged at the different cities. Transfer clerks will be assigned at the different freight houses "to perform the necessary duties" and to weigh the mails, the railway company having a representative present to join in making the record of weight. An officer of one of the roads interested says that the compensation to be received by the railways will be regular third class freight rates, the Official Classification providing that merchandise of this kind shall be carried at third class.

The Indiana Full-Crew Law.

The attorney-general of Indiana, in an opinion given to the railway commission, holds that under the full train crew law of 1907, there can be no successful prosecution against roads which are employing colored men as both porters and brakemen or flagmen. Fred Teick, chairman of the legislative board of the Brotherhood of Railway Trainmen, has complained that instead of putting the number of trainmen required by law on a train, the roads were counting colored porters as trainmen. The law says: "Said brakeman or flagman shall not be required to perform the duties of baggageman, express messenger or porter." The attorney-general points out that there is no provision in any law of Indiana which sets out qualifications for brakemen or flagmen except one section of the full train crew act, which provides that a flagman must have had at least one year's experience in train service. The law is a penal one and must be strictly construed. The provision against requiring trainmen to do other work is so drawn that it is not within the intent of the act,

which is to require the roads to have a specified number of trainmen on each train, this varying according to the size of the train. The brakeman or flagman may perform porter or other duties while the train is in motion. As another law requires trains to be equipped with power driving wheel brakes and appliances for operation by the engineer of the locomotive, the chief purpose of the act requiring a minimum number of men on a train, is to accommodate the traveling public at stations, and to guard against accidents when the train is not in motion. Compliance with the law is accomplished if the required number of men is carried on the train, according to the opinion.

Exercising Discretion.

The Indiana State Railroad Commission has exempted the Lake Erie & Western, and a number of other roads from the order requiring the use of the block system on the roads or on certain sections. The commissioners say that they have no fixed rule under which roads may be exempt, but that the condition of the road bed, the straightness of the track and the number of trains operated each way daily are matters considered. Roads operating fewer than 16 trains a day, or where passenger trains are operated in the daytime for the most part, are among those exempted. The character of equipment and of the employees are also items taken into consideration.

Cost of Grade Crossings on Long Island.

The Long Island has done as much within the last ten years as any road in the country, in the elimination of grade crossings, and the expenditure of money to safeguard crossings at grade, and, in general, to educate the public in the dangers involved. There are 962 points on Long Island where public streets and highways intersect the tracks of the company. Of this number 161 crossings have been eliminated and put under grade and 104 over grade, making a total of 265 crossings abolished—the majority of them during the last decade. The money involved in this work amounts to approximately \$15,000,000. The annual interest charge on the investment is \$750,000, and it represents work for safeguarding the heedless public and not work that improves the operation of the railway, or produces additional revenues, except as insurance against damage.

In addition to this, the company maintains flagmen and gates at 169 crossings, and flagmen, without gates, at 61 crossings, making a total of 230 crossings protected by men on the ground. This means the employment of 350 men, at a cost of about \$200,000 a year. Seventy-four crossings are protected by electric alarm bells which ring automatically with the approach of trains. The installation of crossing gates and bells cost \$115,000. To sum up, we have 265 crossings eliminated, and 304 crossings protected either by flagmen and gates, or flagmen and bells, which leaves 393 crossings protected only by the usual signs specified by the railroad commission. These are placed in conspicuous view on both sides of the tracks, and each sign bears the warning "Look out for the cars. Stop! Look!" Sixty-five of the 393 crossings protected only by signs are on branches of the road where no passenger trains are run and only an infrequent freight service maintained. These have not been reported heretofore, which accounts for the apparent increase over former figures.

The company has added 54 crossing gates and 75 crossing watchmen in the last four years. Work is now under way which will eliminate about twenty more crossings, at a cost of over \$3,000,000. It would mean an initial investment of \$235,000, and add approximately \$250,000 a year to the payroll to cover every crossing with gates and flagmen. The company is doing all that it possibly can in this direction with the revenue derived from its present tariff of rates. To produce the revenue necessary to protect all crossings and to continue the work of elimination, the rates on about 65 per cent. of the traffic would have to be raised at least 25 per cent. This would mean an increase of at least \$2 a month on all forms of commutation tickets.

Why should the traveler on the railway be made to pay more in order to protect the traveler on the highway? The trains must run on fixed tracks at a reasonable speed. The traveler on the highway has freedom of routes, and an opportunity of stopping. Being in small numbers, they should be made to stop and give preference to the railway travelers who are in larger num-

bers, on larger and heavier vehicles, which cannot be safely stopped on short notice or in a short distance.

The Long Island Railroad Company has not earned enough to pay a dividend to its stockholders in nearly fifteen years, notwithstanding the wonderful growth of its territory and its traffic. To keep pace with this growth, it has been compelled to expend in improvements vast sums amounting in ten years to almost the equal of the full capital investment. Traffic and earnings have shown a wonderful response to the expenditures and improvements that have been made. As a result, it will, no doubt, be able to get the money to continue the work of improving the road. If so, crossings will be taken out as rapidly as possible, especially where the company has the aid and co-operation of the state and municipality.

The railroad company will do its full duty in this direction, but it cannot and will not assume the position of public guardian and protector of every thoughtless user of the highway. . . . The legislature should enact a law requiring drivers of automobiles and other vehicles to stop, and make sure that a train is not approaching before attempting to cross tracks.—*Statement by President Peters.*

Handling Freight Claims on the Frisco.

The St. Louis & San Francisco has decided to transfer the entire work of handling claims and payments for loss and damage to freight from the traffic to the operating department. It has also put into effect, beginning August 1, a new system under which station agents are authorized to pay from station funds claims for visible damage to carload and less-than-carload freight, with certain exceptions and within the limit of \$50 for any one claim. Claims for amounts which are in excess of \$50 must be approved by the assistant general manager before payment.

The *Railway Age Gazette* published in its issue of November 12, 1909, page 925, an article on certain changes in the method of handling loss and damage claims which had been made on the Frisco. Under the plan described at that time, investigations were begun by the operating department as soon as freight was reported over, short or damaged; and decisions regarding the liability or non-liability of the company were made, not by the traffic department, but by the operating department. Special measures were also taken to fix responsibility and secure proper discipline for carelessness or violations of the rules by employees which lead to loss and damage. The change now being made is along the same line. It completes the transfer of all duty and responsibility regarding freight damage and claims to the transportation department. The office of superintendent of freight loss and damage claims is created at Springfield, Mo., and effective September 15. J. H. Doggerell is appointed to this office. The official changes consequent on the adoption of this plan are referred to in the Elections and Appointments department of this issue.

The superintendent of freight loss and damage claims will have charge of, investigate and settle claims for damage to freight, loss of freight and delay to freight; reports of freight over, damaged or short; disposition of refused and unclaimed freight; tracing of less-than-carload shipments, and such other duties as may be assigned by the assistant general manager. All letters and reports pertaining to these matters heretofore sent to the assistant general manager and freight claim agent will hereafter be addressed to the superintendent freight loss and damage claims. Under the system which has been in effect on the Frisco, E. D. Levy, assistant general manager and formerly superintendent of transportation, has had charge of the investigations of over, short and damage reports; and the determination of the liability or non-liability of the company has been made in his office. On the other hand, claims have been settled through the office of the freight claim agent at St. Louis. It will be noted that under the new plan both classes of duties are to be performed by the superintendent of freight loss and damage claims. Otherwise the method of handling these matters will be the same as that already described in the *Railway Age Gazette* of November 12, 1909. The superintendent of freight loss and damage claims will report to E. D. Levy, assistant general manager, who has worked out this new system.

Regarding the new method and related plan of having station

agents pay claims for visible damage, an officer of the Frisco writes:

"Prior to August 1 only a few of our agents had authority to pay loss and damage claims of any kind, and when they paid them they were forced to file claim for relief for the amount paid, which was sent to the auditor freight accounts, and by him investigated; and if he found they were entitled to relief it was granted. This sometimes took months and in some cases years, and caused the agents to carry forward from month to month the relief claims that had not been acted upon; and those that did have the authority to pay claims did not pay as many as they should by reason of the fact that it took so long to secure relief and caused so much confusion in station accounts by carrying these open items.

"The thought in inaugurating the new plan was that the agents on the ground could better adjust claims for visible damage than a clerk in the freight claim office hundreds of miles away, provided we could inaugurate a system whereby we could keep a proper check on the agents. The new system we have adopted does give us this check.

"We also had in mind, in inaugurating this system, the idea that it would do more than any one thing to correct public sentiment against the railway. A small merchant in the country would not usually file his claims for small damages with the railway, but he would charge them back to the jobber, and the jobber was forced to maintain a claim bureau in many instances to collect claims of this kind. The merchant filed claims with the jobber because he was not skilled in the handling of claims, and it took him so long to collect the money that he felt the railways were discriminating against him because he was a 'little' shipper; and of course a great many of them have felt aggrieved at the railways on that account. The average country merchant could not understand, when he received a shipment, where the damage was visible, why the agent could not settle with him—why he had to send the claim to some one else hundreds of miles away. Under this new plan the country merchant is made to feel that he is given just as much consideration as the jobber who ships hundreds of cars a year. It promotes friendly relations between the agent and the merchants and does not cost the company anything.

"When a shipment checks damaged at a delivering station the agent has always made a 'bad order' report to the assistant general manager, which he continues to do. When he decides on the amount of damage he uses four copies of form 75-A local, to which he attaches a copy of the bad order report and the usual documents in support of a claim. He pays the claimant his money, secures a receipt and release on this form, mails three copies to the assistant general manager's office, and retains one copy for his file. The assistant general manager approves the copies, sends one of them back to the agent the day it is received, and when the copy with the assistant general manager's approval is received by the agent it becomes cash. All he has to do with it is to list it with others at the end of the month on form 75 local, and send that form to the auditor of freight accounts.

"At the time the assistant general manager approves the copies, and sends one to the agent, he sends the original, together with all of the papers, to the auditor of disbursements and tells him which ones to send back for further investigation and which ones to keep.

"The investigation is started from the assistant-general manager's office immediately on receipt of form 75-A from the agent, and we do not have to defer our investigation until the auditor of disbursements sends such claims back as we ask him for.

"The company takes absolutely no risk, in my opinion, by paying claims under this plan, because we investigate just as vigorously or more so than we did, and the claimant has his money while we are determining whether Bill Jones, Sam Johnson or someone else is responsible, or whether the Frisco or some other railway should pay the claim. From what I can hear, our agents are well pleased with the new plan, and so are our patrons, and I am quite sure it will be a big success."

There are certain exceptions to the authority given station agents to pay claims. An official circular issued on the subject says:

"Agents must not pay claims for damage to perishable freight, alleged loss of grain or coal from carload or less-than-carload shipments, damage to live stock, nor for damage to sewer pipe,

drain tile and kindred articles. All such claims should be promptly forwarded to the freight claim agent at St. Louis for attention.

"Before paying claims, the agent must first satisfy himself of the invoice price and also satisfy himself that proper credit is given for the salvage, or the salvage turned over to the company.

"On shipments of flour damaged by wet, the actual damage is usually very small; when the sacks become wet the flour immediately on the inside forms a paste impervious to water. Claimant should be requested to order new sacks from the mill and re-sack the flour and you will pay claims only for the net loss after this is done. If in doubt as to proper amount of damage or salvage, do not pay claims for wet damage to flour, but send them to the freight claim agent, in the usual way."

Demands of Shop Employees Rejected.

Three of the large railway systems on which demands for recognition of the federation of railway shop employees have been made have rejected them. These are the Harriman Lines, the Illinois Central and the Chicago & North Western. A conference between officers of the Harriman Lines and representatives of the shop employees' unions was held at San Francisco on September 1. It was attended for the railways by J. Kruttschnitt, director of maintenance and operation of the system; E. E. Calvin, vice-president and general manager of the Southern Pacific, and other officers of the Southern Pacific; and the shop employees were represented by J. W. Kline, president of the International Blacksmiths' Union, and the presidents or vice-presidents of the other organizations. At the end of the conference Mr. Kruttschnitt issued the following statement:

"A conference was held between the national officers of the shop employees and Southern Pacific officials. The question of the benefits to accrue to both the company and the men from a federation was fully presented by the international officers. The officers of the railway company explained at length the embarrassment the company would experience in performing its public functions if hampered by a committee vested with sufficient power to control or partially control its operations.

"The discussion lasted from 11 a. m. until nearly 2:30 p. m. without altering the situation."

At a conference with a committee representing the five principal classes of shop employees on its lines, the Chicago & North Western was represented by W. D. Cantillon, general manager, and H. T. Bentley, assistant superintendent of motive power. After the meeting Vice-President Aishton issued the following statement:

"The general manager and assistant superintendent of motive power met with five employees of various crafts of the mechanical department employed at the Chicago shops of this company this morning, and discussed with them whether the Chicago and North Western would make contracts with a federated committee representing all trades and crafts engaged in the shops of this company, or as heretofore, with committees of their employees representing each particular craft.

"The arguments for and against each particular method were gone into in detail and the attitude of the company as distinctly favoring the making and maintenance of contracts with committees representing the particular trades or crafts affected, as well as the desire for maintenance of the business and contract relations heretofore existing with our employees in the various trades, was clearly outlined to the employees present."

The representatives of the federation on the Illinois Central first held a conference with T. J. Foley, assistant general manager. Mr. Foley having indicated that the road would not recognize the federation, appeal was made to W. L. Park, vice-president and general manager; and Mr. Park having upheld Mr. Foley, further appeal was made to President Charles H. Markham. After the conference, which was participated in not only by Mr. Markham, but also by other officers of the Illinois Central, Mr. Markham issued the following statement:

"We had a conference with three of the representatives of the international brotherhood with which we have contracts, and they were told the officers of the Illinois Central could not and would not discuss a new agreement while such contracts are in existence, and that, if cancelled, it must be in the usual, formal manner that has heretofore prevailed and for which the contracts provided and which also stipulates that thirty days' notice

shall be given either party of a desire to change the terms of the same."

The employees subsequently asked for another conference. This Mr. Markham refused. In a letter to W. F. Kramer, secretary of the Blacksmiths' union, he said that never before in the history of the roads the negotiations with labor organizations had it been asked to change contracts except in the usual manner provided for by them; that is, on 30 days' notice. He added that the management of the Illinois Central "has reached the conclusion that its duty to the shipping and traveling public, dependent upon it for transportation facilities, its regard for the welfare of its employees and those dependent upon them, and also for the interests of its ten thousand stockholders, will not permit it to enter into negotiations with an organization, compliance with the initial demands of which would deprive the officers of the company of the power to manage its affairs.

"The paramount interest in this controversy is that of the shipping and traveling public, and, being convinced that it is the ultimate purpose of the federation to consolidate railway service employees into one organization, the management does not feel that public opinion would sustain it in entering into an agreement which would place in the hands of one body the power to throttle the commerce of the country."

The representatives of the nine organizations of employees who are in Chicago, on Tuesday evening, September 5, sent a reply to the letter in which Mr. Markham, president of the Illinois Central, flatly refused to recognize the officers of the federation. It was signed by W. F. Kramer, secretary of the Blacksmiths. It takes issue with Mr. Markham in his assertion that the unions failed to comply with the thirty-day notice clause.

The communication concluded as follows:

"Until equality is recognized, justice cannot manifest itself, and should your attitude be persisted in, such trouble as may result will not be the union's desire, but the seeking of yourself and those whose interests you represent. There are too many people teaching details of conduct who do not even understand first principles. . . . The Illinois Central, through its astute representatives, in seeking to shift the burden of responsibility, presents an argument based on a claimed technical violation of contract provisions. The apparent absurdity of the position assumed led to the introduction of a sentimental solicitude for the shipping and traveling public, that is, has been and always will be despised by railway magnates unless self-interests dictate a change of policy from the usual one of the 'public be d—d.'"

The letter included a copy of a letter sent to Mr. Markham from Paducah, Ky., June 10, by McCreery and Bowen, giving notice of a desire for a conference for the purpose of adopting working agreements.

American Society of Civil Engineers.

The first meeting of the season of 1911-12 of the American Society of Civil Engineers was held on Wednesday, September 6. A paper by George B. Francis and Joseph H. O'Brien, members Am. Soc. C. E., entitled The New York Tunnel Extension of the Pennsylvania Railroad: Certain Engineering Structures of the New York Terminal Area, was presented for discussion and illustrated with lantern slides. This paper was printed in the *Proceedings* for May, 1911.

New York Railroad Club.

The next regular meeting of the New York Railroad Club will be held at the building of the United Engineering Societies on September 15, 1911. The committee appointed to nominate officers for the ensuing year will present its report, and Edwin J. Clapp, of the New York University, will present a paper on German Waterways, which will be illustrated with lantern slides.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.
AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Scranton, Pa.
AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—C. M. Burt, Boston, Mass.; next meeting, St. Paul, Minn., Sept. 19, 1911.
AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, East St. Louis, Ill.
AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—O. G. Fetter, Carew building, Cincinnati, Ohio; 3d Friday of March and September.

Traffic News.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—H. C. Donecker, 29 W. 39th St., New York; October 9-13, 1911, Atlantic City, N. J.

AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York; November 15, 1911, Chicago.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago; Oct. 17-19, 1911, St. Louis, Mo.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, Monadnock Block, Chicago; annual convention, March 19-21, 1912, Chicago.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—O. T. Harroun, Bloomington, Ill.

AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., New York; 1st and 3d Wed., except June and August, New York.

AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—D. J. Haner, 13 Park Row, New York; 3d Tuesday of each month, New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.

ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago; annual, June 26, 1912, Quebec, Que.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—J. R. McSherry, C. & E. I., Chicago; annual convention, May 22, 1912, Los Angeles, Cal.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago; annual, November 6-10, Chicago.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 135 Adams St., Chicago; annual, June 24, 1912, New York.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York; December 12-13, Louisville, Ky.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tuesday in month, except June, July and Aug., Montreal.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursdays, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Thurs. in Jan. and 2d Fri. in March, May, Sept., Nov., Buffalo, N. Y.

CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—D. F. Jurgensen, 116 Winter St., St. Paul, Minn.; 2d Monday, except June, July and Aug., St. Paul.

ENGINEERS' SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.; 1st Monday after 2d Saturday, Harrisburg, Pa.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, 803 Fulton building, Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Richmond, Va.; annual, Buffalo, N. Y.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—E. S. Koller, 226 W. Adams St., Chicago; Wed. preceding 3d Thurs., Chicago.

INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, rue de Louvain, 11 Brussels; 1915, Berlin.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Sebastian, La Salle St. Station, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, D. & I. R. Ry., Two Harbors, Minn.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio; annual, Aug. 15, Toledo, Ohio.

IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August, Des Moines.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION, OF UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass.; Sept. 12-15, 1911, Atlantic City, N. J.

NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.

NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August, New York.

NORTHERN RAILWAY CLUB.—C. L. Kennedy, C. & M. & St. P., Duluth, Minn.; 4th Saturday, Duluth.

OMAHA RAILWAY CLUB.—H. H. Maulick, Barker Block, Omaha, Neb.; second Wednesday.

RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.

RAILWAY CLUB OF PITTSBURGH.—C. W. Alleman, P. & L. E., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.

RAILWAY INDUSTRIAL ASSOCIATION.—G. L. Stewart, St. L. S. W. Ry., St. Louis, Mo.; annual, May 12, 1912, Kansas City, Mo.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Bethlehem, Pa.; annual, Oct. 10, Colorado Springs, Colo.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio.

RICHMOND RAILROAD CLUB.—F. O. Robinson, Richmond, Va.; 2d Monday, except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—Walter E. Emery, P. & P. U. Ry., Peoria, Ill.; September 12-15, 1911, St. Louis, Mo.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station, Chicago; Sept. 12-14, St. Paul, Minn.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.; annual, October 20, Atlanta, Ga.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept., Nov., Atlanta.

TOLEDO TRANSPORTATION CLUB.—J. G. Macomber, Woolson Spice Co., Toledo, Ohio; 1st Saturday, Toledo.

TRAFFIC CLUB OF CHICAGO.—Guy S. McCabe, La Salle Hotel, Chicago; meetings monthly, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August, New York.

TRAFFIC CLUB OF PITTSBURGH.—T. J. Walters, Oliver building, Pittsburgh, Pa.; meetings monthly, Pittsburgh.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7042 Stewart Ave., Chicago; annual, June 18, 1912, Louisville, Ky.

TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; first Saturday after first Wednesday.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, L. S. & M. S., Detroit, Mich.; meetings monthly.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony building, Chicago; 3d Tuesday of each month, except June, July and August.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago; 1st Wednesday in month except July and August, Chicago.

WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Baltimore, Md.; annual, January 16-18, Chicago.

Shipments of coal by river from Pittsburgh on the "coal boat rise" of the river last week, amounted to 8,000,000 bushels, said to be the largest movement of the kind on record.

The Chicago & Eastern Illinois has put on a seven-hour mail train between Chicago and St. Louis in response to the request of the post office department for bids for faster schedules between those points. A train, consisting of a postal car, a storage mail car and a reclining chair car, will leave Chicago daily at 7 p. m. and reach St. Louis at 2 a. m., and a similar train having the same hours for departure and arrival will be run from St. Louis to Chicago. These schedules are 45 minutes shorter than the fastest schedule previously in effect.

An officer of the Pennsylvania estimates that in 85 per cent. of the small-lot shipments moving today the construction of the material forming the box or crate, the size of the nails, etc., are entirely inadequate to protect the contents. Insufficient packing of goods for shipment costs American manufacturers many thousands of dollars every year. The introduction of cheap paper and other substitutes for substantial wooden cases is responsible for much of the trouble. More attention is given all the time to making packages attractive in appearance, but less care is taken to make them safe. Fruit is shipped in paper-thin crates that are sometimes literally churned into pulp in transit. Tobacco is sent by rail in cases so flimsy that they can be perforated with a lead pencil. Heavy hardware is seldom packed carefully enough to keep it from breaking through its casing. Very often no thought is taken of the damage that may be done to freight when packed in cars with heavy, rough, or pointed articles. The way to save the large sums now lost through insufficient or improper packing is to go back to substantial wooden cases. No safe substitute has been found for them.

The Cotton Bill of Lading Bureau, New York City, announces that seventy-five railroads of the southern states, including all of the principal cotton carriers, have signed an agreement under which they will send to the bureau copies of bills of lading of all shipments of cotton destined for Europe. The bureau hopes that shippers of cotton, in sending bills of lading to their New York correspondents, will send also a letter, addressed to the bureau, requesting it to furnish the New York buyer with all available information concerning his shipment. A representative of the Liverpool conference which established this bureau, says that the losses by the frauds of a year ago aggregated \$6,000,000. The bureau is supported by The Transportation Mutual Insurance Company, which in the past has had an interest in the insurance of nearly or quite all of the cotton exported from this country. The insurance people say that they have a strong interest in the establishment and maintenance of the bureau because of losses by fire from which they have suffered in the past. Forgers have succeeded in using bills of lading for which no cotton has been shipped, and then have seen to it that the warehouse supposed to contain the imaginary cotton was set afire.

Condition of Cotton Crop.

The report of the Department of Agriculture for August 25 shows the condition of the cotton crop on that date as 73.2 per cent. of normal, as compared with 72.1 per cent. last year and 73.5 per cent. (average) on the same date for the past ten years. A month ago the condition was reported as 89.1 per cent. During the month the condition of the crop has fallen off in all of the important cotton growing states, the smallest loss being in Tennessee, where the percentage dropped from 92 to 88. In Virginia it fell from 102 to 96.

INTERSTATE COMMERCE COMMISSION.

The commission has authorized rates over the Atlantic Coast Line and other roads from Durham, N. C., to Richmond and other points in Virginia on certain cotton goods, in disregard of the long and short haul rule; and has also issued a similar order concerning certain rates on cotton goods over the Southern

Railway from points in North and South Carolina to points in Virginia, West Virginia and Maryland.

The commission has suspended until March 27 next certain tariffs on potatoes from Texas to points in the territory of the Central Freight Association. Different tariffs from different parts of Texas name minimum carload weights, said to be inconsistent with one another.

The investigation of the operations of express companies, which is being made by the commission, has involved such a large amount of work that public hearings will not be held for several weeks yet. The clerks in the office of the commission are using a large number of tabulating machines collating information from the waybills of the express companies.

The commission has issued an order allowing temporary changes in freight classifications regardless of possible violation of the long and short haul rule. This order applies to all tariffs concerning which the railways made application to the commission for relief before February 18 last. The purport of the order is to allow railways to defer final changes until the work of the committee on uniform classification shall have been brought more nearly to a conclusion. It permits the making of changes in classification ratings, rules and regulations occurring in the ordinary course of business.

STATE COMMISSIONS.

The Nashville, Chattanooga & St. Louis has filed suit in Alabama against the railroad commission of that state, praying for relief from a recent order of the commission requiring the running of a Sunday train between Guntersville and Attalla. The company declares that the order is unfair and unreasonable; that there is not sufficient patronage to justify a Sunday service, and that the commission has no authority to require the company's employees to work on the Sabbath day.

The New York State Public Service Commission, Second district, has ordered all public service corporations within its jurisdiction, maintaining poles or other structures for carrying overhead wires, to stencil or mark such poles with the initials of the owner and with a number whereby the location of any pole may be identified. Investigations made by inspectors of the commission show a general lack of such stencilling throughout the state, which is necessary for identification of poles as to ownership and location, in the inspection of construction, in service complaints and in valuation proceedings.

The Texas commission has issued an order recognizing the Fort Worth & Rio Grande, the St. Louis, San Francisco & Texas, the Paris & Great Northern and the Brownwood North & South railways as being under the same management and control. This action was taken on the application of the Fort Worth & Rio Grande, and the order has the effect of requiring that hereafter freight moving over two or more of these lines shall take the single-line rate. All of the roads named belong to the Frisco system. It is expected that at the next regular session of the legislature application will be made by the Frisco for the legal authorization of the consolidating of these roads as well as the Orange & Northwestern, the St. Louis, Brownsville & Mexico and the Quanah, Acme & Pacific with the other lines of the Frisco in Texas.

After consideration of the case of the Kansas City Transportation Bureau versus the Chicago, Burlington & Quincy, alleging excessive rates on iron and steel articles, etc., from St. Louis to Kansas City, the Missouri Railway Commission has ordered that, effective October 1, the rates charged by Missouri roads on iron and steel angles, bars, rods, sheet and plate roofing, horseshoes, nails, iron and steel wire, bolts, nuts, washers, and various other articles made of iron and steel, in straight or mixed carloads, shall not exceed 7 cents per 100 lbs. for distances of 25 miles and under; 10 cents for distances of from 50 to 100 miles; 13 cents for distances of from 100 to 150 miles; 15 cents for distances of from 150 to 200 miles; 17 cents for distances of from 200 to 250 miles; 19 cents for distances of from 250 to 300 miles; and 21 cents for distances of from 300 to 350 miles. The minimum carload weight shall be 36,000 lbs., subject to change by the Western Classification Committee.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

Morris McDonald, vice-president and general manager of the Maine Central, has been elected also president and general manager of the Sandy River & Rangeley Lakes, and the following officers of the Maine Central have been elected also to similar positions on the Sandy River & Rangeley Lakes: G. S. Hobbs, second vice-president and comptroller, and George W. York, treasurer, all with offices at Portland, Me. The offices of the accounting department of the Sandy River & Rangeley Lakes have been transferred from Gardner, Me., to Portland.

W. C. Nixon, vice-president of the St. Louis & San Francisco at St. Louis, Mo., has been elected also president of the Brownwood North & South, a line under construction in Texas. C. L. McCartney has been elected vice-president and secretary, with office at Brownwood, Tex., and the following officers of the St. Louis & San Francisco have been elected vice-presidents: W. B. Biddle, vice-president at St. Louis; W. T. Tyler, general manager at Springfield, Mo., and W. B. Drake, vice-president and general superintendent of the St. Louis, San Francisco & Texas at Fort Worth, Tex. Brooke Smith has been elected treasurer, with office at Brownwood, and F. H. Hamilton, secretary and treasurer of the St. Louis & San Francisco, has been appointed assistant secretary and assistant treasurer at St. Louis. L. C. Voelkel has been appointed auditor at Brownwood, Tex., and E. B. Pierce, assistant auditor, at Fort Worth, Tex.

Operating Officers.

W. C. Hurst, superintendent of the Cincinnati, Hamilton & Dayton at Dayton, Ohio, has resigned to engage in other business.

Homer Eads, division superintendent of the International & Great Northern at San Antonio, Tex., has resigned to engage in other business.

H. E. Richards has been appointed assistant superintendent of the Union Pacific, with office at Ellis, Kan., succeeding F. M. Jones, transferred.

M. A. Mulligan has been appointed trainmaster of the Lehigh Valley, with office at Jersey City, N. J., succeeding C. A. Austin, resigned to go to another company.

I. H. Luke has been appointed superintendent of the Fourth division of the Denver & Rio Grande, with office at Alamosa, Col., succeeding S. H. Barnes, resigned.

D. H. Robinson, trainmaster of the Missouri Pacific at Nevada, Mo., has been appointed trainmaster, with office at Jefferson City, Mo., succeeding R. G. Carden, promoted.

L. C. Voelkel has been appointed trainmaster of the Brownwood North & South, a line under construction in Texas, with office at Brownwood, Tex. See item under Executive, Financial and Legal Officers.

Charles Selden, superintendent of telegraph of the Baltimore & Ohio, at Baltimore, Md., has been promoted to general inspector of transportation. Mr. Selden will continue in the discharge of the duties of superintendent of telegraph.

H. C. Manchester, superintendent of transportation of the Maine Central, has been appointed also superintendent of transportation of the Sandy River & Rangeley Lakes, with office at Portland, Me. See Executive, Financial and Legal Officers.

J. M. Walsh, terminal trainmaster of the St. Louis & San Francisco at Memphis, Tenn., has been appointed superintendent of the Memphis terminals, with jurisdiction from the south limits of Bellevue yard to the north limits of Harvard yard, including the Marion-Hulbert cut-off.

James H. Brinkerhoff, until July of this year general traffic manager and general superintendent of the Grand Junction & Grand River Valley at Grand Junction, Colo., has been appointed superintendent of passenger terminals of the Illinois Central, with office at Chicago, succeeding William D. Dunning, resigned.

John K. Fahey, inspector of transportation of the Louisiana Western and Morgan's Louisiana & Texas R. R. & S. S. Co., at Houston, Tex., has been appointed superintendent of the Lake Charles & Northern, and general superintendent of the Louisiana & Pacific, with office at De Ridder, La., succeeding C. M. Boswell, resigned to go to another company.

H. W. Matthews, passenger trainmaster of the Grand Trunk at Detroit, Mich., has been appointed trainmaster of the 25th district (G. T. W.) 29th district (Detroit division) with office at Port Huron, and his former position has been abolished. All reports heretofore made to the assistant superintendent at Battle Creek, and trainmaster at Durand, from these districts, will in future be made to the trainmaster at Port Huron.

The following officers of the Oregon Short Line will hereafter be designated as assistant general managers. E. C. Manson, general superintendent; F. H. Knickerbocker, assistant to general manager; J. F. Dunn, superintendent of motive power; Carl Stradley, chief engineer, and A. E. Hutchinson, general purchasing agent, all with offices at Salt Lake City, Utah. They will continue in charge of duties heretofore devolving on them and retain their former titles to such extent only as may be necessary for compliance with the law and existing contracts.

Incident to a change in the operation of the freight claim department of the St. Louis & San Francisco (see item in General News Section), J. H. Doggerell, car accountant at Springfield, Mo., has been appointed superintendent of freight loss and damage claims, with office at Springfield. He will have charge of, investigate and settle claims for damage to freight, loss of freight and delay to freight; reports of freight over, damaged or short; disposition of refused and unclaimed freight; tracing of less-than-carload shipments, and such other duties as may be assigned by the assistant general manager. G. E. Whitelam, chief clerk to the assistant general manager at Springfield, has been appointed assistant superintendent of freight loss and damage claims.

Robert George Carden, whose appointment as superintendent of the Missouri Pacific, with office at Atchison, Kan., has been announced in these columns, was born in April, 1869, at Mt. Zion, Ill. He received a common school education, and began railway work in 1886 with the Peoria, Decatur & Evansville, now part of the Illinois Central, where he was employed as water boy and then track laborer. He learned telegraphy while working on a farm at Mt. Zion during the summer of 1888, and went with the Wabash as night operator in December of that year, and was later day operator and then despatcher of the Wabash. In January, 1903, he was appointed chief despatcher of the Southern Railway at Charleston, S. C., and was then consecutively, chief despatcher of the Kansas City Southern and despatcher of the Atchison, Topeka & Santa Fe. He went with the Missouri Pacific in September, 1905, as a despatcher at Osawatomie, Kan., and was promoted the next year to chief despatcher at that place. He was appointed trainmaster of the Omaha division in October, 1907, with office at Jefferson City, Mo., which position he held at the time of his promotion as above.

Traffic Officers.

H. C. Halverson, traveling passenger agent of the Missouri Pacific at Little Rock, Ark., has been transferred to Chicago, succeeding J. A. Russell, resigned. C. S. Blackman succeeds Mr. Halverson.

Harry Jones has been appointed soliciting freight agent of the Galveston, Harrisburg & San Antonio, with headquarters at Houston, Tex., succeeding Arthur Shelby, resigned to engage in other business.

A. E. Brown, traveling freight agent of the Minneapolis, St. Paul & Sault Ste. Marie at Cincinnati, Ohio, has been appointed traveling freight and passenger agent of the Colorado Midland, with office at Chicago.

L. C. Voelkel has been appointed general freight and passenger agent of the Brownwood North & South, a line under construction in Texas, with office at Brownwood, Tex. See item under Executive, Financial and Legal Officers.

J. F. Reily, traveling freight agent of the Missouri, Kansas & Texas at St. Louis, Mo., has been appointed commercial agent,

with office at Oklahoma City, Okla., succeeding J. J. Hartnett, resigned. J. F. Dodge succeeds Mr. Reily.

H. C. Bronson has been appointed freight and passenger agent of the Rock Island Lines, at Sacramento, Cal., and J. Merrow, Jr., has been appointed a commercial agent with office at Louisville, Ky., succeeding T. W. Bennett, promoted.

F. G. Frieser, assistant foreign freight agent of the Canadian Pacific at New York, has been appointed export foreign freight agent in charge of export traffic via the Atlantic seaboard, with office at Montreal, Que., succeeding E. N. Todd, transferred. L. D. Cole succeeds Mr. Frieser.

W. A. Boehm, traveling freight agent of the Minneapolis, St. Paul & Sault Ste. Marie at Cincinnati, Ohio, has been promoted to succeed A. E. Brown, who held the same title, with office at Cincinnati, and who has resigned to accept service with another company. R. E. Pierce succeeds Mr. Boehm.

G. L. Moore, whose appointment as commercial agent of the Texas & Pacific at Oklahoma City, Okla., has been announced in these columns, has been appointed also commercial agent of the International & Great Northern, his territory to include the state of Oklahoma and such Texas territory as may be assigned to him.

J. E. Buckingham, assistant general passenger agent of the Chicago, Burlington & Quincy, at Omaha, Neb., has been appointed general baggage agent, with office at Chicago, succeeding John De Witt, resigned to engage in other business, and L. H. Stebbins has been appointed assistant general baggage agent, with office at Lincoln, Neb.

G. C. Knickerbocker, traveling freight agent of the Wabash at Toledo, Ohio, has been appointed traveling freight agent, with office at Buffalo, N. Y., and J. L. Craig, agent at Peru, Ind., succeeds Mr. Knickerbocker. James S. Buchanan, ticket agent at Moberly, Mo., has been appointed traveling freight and passenger agent, with office at Moberly, succeeding I. M. Richards, transferred to other duties.

Professor A. E. Chamberlain, formerly connected with the South Dakota Agricultural College, has been appointed development commissioner of the Great Northern, with office at St. Paul, a new position. It will be his duty to aid the states through which the road passes in agricultural, commercial and manufacturing lines, much of his time to be devoted to the encouragement of better agricultural methods.

Eugene McAuliffe, general fuel agent of the St. Louis & San Francisco, the Chicago & Eastern Illinois and the Evansville & Terre Haute, at Chicago, has been appointed general agent of all Frisco lines, with office at St. Louis, Mo., and the office of general fuel agent has been abolished. In addition to his former duties, Mr. McAuliffe will assist the traffic department in the solicitation and handling of coal traffic. C. G. Hall has been appointed fuel agent of the Chicago & Eastern Illinois, with office at Chicago.

J. B. Payne, commercial agent of the Texas & Pacific and the International & Great Northern at Birmingham, Ala., has been transferred to Chicago, where he will report to the assistant general freight agent at St. Louis, Mo. T. B. Moss commercial agent at Kansas City, Mo., succeeds Mr. Payne, and H. H. Taylor, commercial agent at St. Louis, Mo., succeeds Mr. Moss. A. P. Smirl, chief clerk at St. Louis, succeeds Mr. Taylor. O. E. Duggan, traveling freight agent at Birmingham, has been transferred to Chicago, where he will report to Mr. Payne. G. A. Deuel has been appointed traveling freight agent, with office in New York City. R. H. Carrington, general agent of the Texas & Pacific at El Paso, Tex., has been appointed traveling freight and passenger agent of that road, with office at Phoenix, Ariz., and the office of general agent at El Paso has been abolished, as was previously announced in these columns.

H. Bromley having retired as general coal and ore agent of the New York Central Lines, west of Buffalo, with office at Cleveland, Ohio, a change has been made in the organization of the coal and ore department, and H. M. Griggs, assistant general coal and ore agent of the lines west of Buffalo, has been appointed general coal and ore agent, with office at Chicago, in charge of coal and coke traffic originating at points in Illinois,

Indiana and Michigan, and in the territory south of the Ohio river when moving via Ohio river gateways, except that which moves via Lake Erie ports, and J. B. Nettle, general freight agent of the Pittsburgh & Lake Erie at Pittsburgh, Pa., has been appointed general coal and ore agent, with office at Cleveland, in charge of coal and coke traffic originating at points in Pennsylvania and Ohio, and at points in West Virginia when moving via other than Ohio river gateways, including all coal, coke and iron ore traffic via Lake Erie ports; both general coal and ore agents reporting to the freight traffic manager at Chicago. W. A. Newman, general freight agent of the Lake Shore & Michigan Southern at Cleveland, has been appointed also general freight agent of the Pittsburgh & Lake Erie, with office at Pittsburgh, in charge of traffic other than coal, coke and iron ore, succeeding Mr. Nettle.

O. P. McCarty, who has been appointed passenger traffic manager of the Baltimore & Ohio System, with office at Baltimore, Md., was born at Massillon, Ohio, and began railway work on June 1, 1864, as a clerk in the general ticket office of the Cincinnati & Chicago Air Line, now a part of Pittsburgh, Cincinnati, Chicago & St. Louis, since which time he has been continuously engaged in the passenger business with various roads. In May, 1881, he was appointed assistant general ticket agent of the Union Pacific, and from November, 1887, to May of the following year he was chief rate clerk of the Trunk Line Passenger Committee of New York. He was appointed chief clerk in the general passenger office at Baltimore, of the Baltimore & Ohio in May, 1888, and in August of the following year was promoted to assistant general passenger agent, becoming general passenger agent of the Baltimore & Ohio Southwestern on March 1, 1890, with office at Cincinnati, Ohio, which position he held until September, 1894. The following month he went with the Southern Pacific as general traveling passenger agent at New Orleans, La., and was promoted in December, 1896, to assistant general passenger agent at New Orleans. He resigned from this position in October, 1897, to re-enter the service of the Baltimore & Ohio Southwestern as general passenger agent at Cincinnati, which position he held at the time of his recent appointment. Since March of this year Mr. McCarty has also been general passenger agent of the Cincinnati, Hamilton & Dayton.

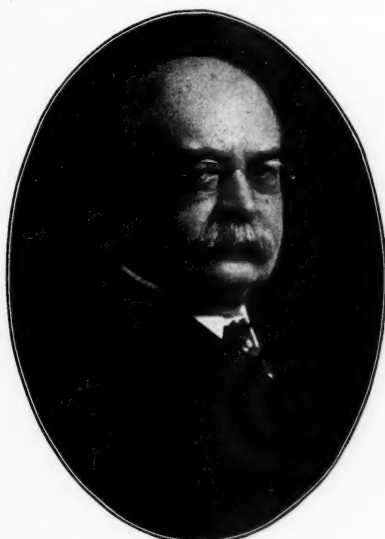
Engineering and Rolling Stock Officers.

R. B. Burke has been appointed acting chief engineer of construction of the Chesapeake & Ohio, with office at Richmond, Va., succeeding to the duties of Henry Pierce, chief engineer of construction, deceased.

T. L. Dunn, chief engineer of the Maine Central, and P. M. Hammett, superintendent of motive power, both with offices at Portland, Me., have been appointed also to similar positions on the Sandy River & Rangeley Lakes.

T. E. Freeman of the Chicago, St. Paul, Minneapolis & Omaha at Sioux City, Iowa, has been appointed general foreman of locomotive repairs on the Duluth & Iron Range, at Two Harbors, Minn., succeeding L. H. Bryan, resigned to go to the Chicago Pneumatic Tool Company.

C. J. McCarthy, chief carpenter in the Northern district of the Chicago, Milwaukee & St. Paul at Minneapolis, Minn., has been transferred to Aberdeen, S. D., succeeding E. Collins, resigned, to go to the Chicago, Milwaukee & Puget Sound, and W. H. MacArthur succeeds Mr. McCarthy.



O. P. McCarty.

F. G. Jonah, chief engineer of construction of the St. Louis & San Francisco at St. Louis, Mo., has been appointed also consulting engineer of the Brownwood North & South, a line under construction in Texas. Thomas Yates has been appointed chief engineer, with office at Brownwood, Tex.

The following general foremen on the New York, Ontario & Western have had their titles changed to master mechanic: P. H. Minshull, Southern division, Middletown, N. Y.; W. W. Daley, Northern and Utica divisions, Norwich, N. Y.; W. H. Kinney, Scranton division, Carbondale, Pa., and the title of general foremen on the above divisions has been discontinued. Harvey Shoemaker has been appointed shop superintendent at Middletown.

J. H. Nuelle, assistant engineer of the New York, Ontario & Western at Norwich, N. Y., has been appointed principal assistant engineer, with office at Middletown, succeeding to the duties of J. C. Bentley, resigned, and the office of assistant engineer at Middletown has been abolished. D. W. Fagley, Jr., succeeds Mr. Nuelle; F. J. Meyer has been appointed supervisor, with office at Kingston, succeeding A. Van Aken, resigned, and R. F. Gies, bridge inspector has been appointed bridge and building inspector.

Purchasing Officers.

C. D. Barrows, purchasing agent of the Maine Central, has been appointed also purchasing agent of the Sandy River & Rangeley Lakes, with office at Portland, Me.

Special Officers.

F. J. Angier has been appointed superintendent of timber preservation of the Baltimore & Ohio, with office at Baltimore, Md., reporting to the general manager.

The appointment of Victor J. Bradley to a position on the Pennsylvania was noted last week. His title is general inspector of mail service, and he will have supervision of the handling of mail on all the lines of the company. He will report to E. T. Postlethwaite, assistant to the president. Mr. Bradley has been connected with the government mail service since 1875, and since 1896 has been superintendent of the Second division, with headquarters in New York City.

OBITUARY.

Bradford Lee Gilbert, the architect of the first steel frame "skyscraper" in New York, being the second building of its kind designed in the country, died on September 1, at the age of 57. Mr. Gilbert designed several large railway stations, including the remodeling of the Grand Central station, New York, about 15 years ago, and the union station at Atlanta, Ga. He was particularly successful with small stations, of which he designed a great many.

Henry Pierce, chief engineer of construction of the Chesapeake & Ohio, died at Clifton Springs, N. Y., August 21. Mr. Pierce was born on June 7, 1859, at Quaker Hill, N. Y., and was graduated from Cornell University in 1880. He began railway work in 1881, on the Cincinnati & Southern, as a levelman. For several years he was engineer of maintenance-of-way of the Cincinnati, Hamilton & Dayton. In March, 1889, he became engineer of maintenance-of-way of the Western division of the Chesapeake & Ohio, and from 1902 to 1905 he was superintendent of the Greenbrier division. At the time of his death he was chief engineer of construction.

William W. Wimer, division freight agent of the New Jersey division of the Pennsylvania Railroad, died on Tuesday last at Wynnewood, Pa. His death was due to ptomaine poisoning. Mr. Wimer was born in Philadelphia in 1856, and entered the service of the Pennsylvania Railroad February 1, 1874, as clerk in the freight office at Thirteenth and Market streets, Philadelphia. In 1882 he was transferred to the general freight department. He became chief clerk to the through freight agent October 1, 1887, and on December 1, 1888, he was appointed chief clerk to the eastern superintendent of the Star Union Line, with office in New York City. He was promoted to chief clerk of the general freight department at Philadelphia on June 1, 1897, and was appointed division freight agent of the New Jersey division June 1, 1903.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

THE PORTLAND, GREY & LEWISTON, Lewiston, Maine, has ordered one 35-ton electric locomotive from the Westinghouse Electric & Manufacturing Company.

THE CITY & COUNTY CONTRACT COMPANY, West Chester, N. Y., has ordered one 80-ton electric switching locomotive from the Westinghouse Electric & Manufacturing Company.

THE WICHITA FALLS ROUTE has ordered 2 ten-wheel locomotives from the Baldwin Locomotive Works. The dimensions of the cylinders will be 18 in. x 26 in., the diameter of the driving wheels will be 56 in., and the total weight in working order will be 204,000 lbs.

THE RALEIGH & SOUTHPORT has ordered one consolidation locomotive from the Baldwin Locomotive Works. The dimensions of the cylinders will be 20 in. x 24 in.; the diameter of the driving wheels will be 50 in., and the total weight in working order will be 144,000 lbs.

THE LAKE SUPERIOR TERMINAL AND TRANSFER has ordered 1 eight-wheel switching locomotive from the Baldwin Locomotive Works. The dimensions of the cylinders will be 20 in. x 26 in., the diameter of the driving wheels will be 50 in., and the total weight in working order will be 143,550 lbs.

THE ELKIN & ALLEGHANY, Raleigh, N. C., has ordered one consolidation locomotive from the Baldwin Locomotive Works. The dimensions of the cylinders will be 20 in. x 24 in.; the diameter of the driving wheels will be 50 in., and the total weight in working order will be 144,000 lbs.

CAR BUILDING.

THE ONTARIO & SAN ANTONIO HEIGHTS has ordered 3 interurban cars with Brill trucks from the Kuhlman Car Company.

THE CHICAGO, INDIANAPOLIS & LOUISVILLE is taking prices on 1,000 general service gondola cars of the company's own design.

THE SOUTHWESTERN TRACTION & POWER COMPANY, New Orleans, La., is in the market for 4 double truck, interurban cars, 2 single-truck city cars and 2 trailer cars.

IRON AND STEEL.

THE BOSTON & ALBANY is in the market for 5,000 tons of bridge material.

The Canadian Pacific has ordered 1,200 tons of rails from the Illinois Steel Company.

The Pittsburgh & Lake Erie has ordered 2,100 tons of rails from the Carnegie Steel Company.

THE KANSAS CITY TERMINAL COMPANY has ordered 2,200 tons of structural material from the American Bridge Company for the grade separation work in connection with the new terminal.

GENERAL CONDITIONS OF STEEL.—The high rate of production is still maintained in the steel industry in spite of the falling off in orders. It is expected, however, that operations will be reduced during the coming week. There has been some price cutting, but only on the part of the smaller independents. The volume of business at present is above the average for the last ten years, but the prices are lower. After October 1 a readjustment of prices to a higher level may be effected.

SIGNALING.

Interlocking station "B" at the Grand Central station, New York City, described in the *Railway Age Gazette* of May 12, last, the principal interlocking for the tracks of the lower level, was put in service on August 20, and the temporary interlocking cabin heretofore in use in that part of the yard was abandoned. The machine in station B has 400 levers, but only a part of the tracks of the lower level are yet in use. Station U, at the north end of the yard, Fifty-seventh street, was put in use several months ago.

Supply Trade News.

Gano Dunn, for many years chief engineer and vice-president of the Crocker-Wheeler Company, Ampere, N. J., has resigned to go into other business.

The McKeen Motor Car Company, Omaha, Neb., has shipped a 70-ft. car to Ogden, Utah, for the Oregon Short Line. This makes the sixth car for this line.

Luther H. Bryan, general foreman of the Duluth & Iron Range, Two Harbors, Minn., and widely known as the secretary of the International Railway General Foremen's Association, has left railway service to take a position with the Chicago Pneumatic Tool Company, Chicago, as its representative at Birmingham, Ala. Mr. Bryan entered the employ of the Duluth & Iron Range as a machinist in 1893, and was made general foreman in 1895.

Frederick M. Nellis, New England representative of the Westinghouse Air Brake Company, Pittsburgh, Pa., and the Westinghouse Traction Brake Company, has resigned his position to become western representative of the General Equipment Company, New York, with office in Chicago. At the age of 14 Mr. Nellis entered the shops of the Pennsylvania lines at Dennison, Ohio, where he served three years as machinist apprentice; for the next three years he was fireman, and for the following two years was engineman on the same line. In 1887 he resigned to become traveling engineer of the Pittsburgh Locomotive Works Company, Pittsburgh, Pa. In 1889 he went to the Westinghouse Air Brake Company. In 1897 he obtained a two years' leave of absence to take a special course in mechanical engineering at Cornell University. Mr. Nellis is secretary of the Air Brake Association.

TRADE PUBLICATIONS.

SIDE BEARINGS.—The A. Stucki Company, Pittsburgh, Pa., has issued an illustrated catalog containing complete descriptions of its frictionless side bearings for electric and steam passenger and freight cars.

FROGS AND CROSSINGS.—The Frog, Switch & Manufacturing Company, Carlisle, Pa., has published a 150-page illustrated catalog, which completely covers the line of frogs, switches and crossings for standard and narrow gage railways made by this company.

LATHES.—Joseph T. Ryerson & Son, Chicago, have published an attractive catalog of Prentice high-speed, geared-head lathes, high-speed geared-head turret lathes, heavy-duty double back-geared lathes and engine lathes. The illustrations are large and the descriptions are detailed and clear.

WATERPROOFING.—The Ceresit Waterproofing Company, Chicago, has published a small booklet on Ceresit waterproofing, enumerating the prime requirements of a perfect waterproofing material and telling how Ceresit meets them all. Ceresit is a cream white paste of the consistency of butter, and is simply added to the water and used in mixing mortar or concrete. The booklet includes many illustrations of buildings in which Ceresit is used.

FEED WATER HEATERS.—The Bates Machine Company, Joliet, Ill., has issued a catalog of its cast iron heaters and receivers with cut-out valves. These heaters combine purifiers, oil separators and condensation receivers. Many advantages of these heaters are enumerated, one of the principal ones being economy, and the merits of the Cookson or open type heater are compared with those of the closed or pressure type. The catalog is illustrated and contains detailed descriptions and diagrams.

PRESSURE FILTERS.—James Beggs & Co., New York, have published a catalog of Blackburn-Smith pressure filters. These filters depend upon small, easily removable cloth-covered cartridges for removing suspended matter from water, and are useful in clarification of a murky water supply and in removing oil and slime from boiler water. The system of separate and successive filtrations through the cartridges compels clarification. The system is thoroughly discussed and illustrated in the catalog.

Railway Construction.

New Incorporations, Surveys, Etc.

ARIZONA ROADS.—The Universal Mining & Development Company, of which H. A. Cogswell is president, is said to be back of a project to build an 18 mile line from Campo, Ariz., to the Pine Valley Mining district.

ATCHISON, TOPEKA & SANTA FE COAST LINES.—Contracts are to be let soon, it is said, for double-tracking a section of 31 miles from Needles, Cal., west.

CANADIAN NORTHERN.—According to press reports this company will build a branch from Kamloops, B. C., southeast to Spokane, Wash.

An officer writes that the Canadian Northern Pacific Railway, which is carrying out the work in British Columbia for the Canadian Northern, has let contracts for all the work, except the steel bridges, from Yellow Head Pass, B. C., via Fraser river, north branch of the Thompson river, and south branch of the Thompson river, to Vancouver, 500 miles. The principal contractors are the Canadian Northern Construction Company and Foley, Welch & Stewart. The work will be very heavy. It has not yet been determined what the number and length of the bridges will be on the line. (September 1, p. 453.)

CANADIAN NORTHERN PACIFIC.—See Canadian Northern.

DEERING SOUTHWESTERN.—An officer writes that work is now being pushed on an extension from Converse, Mo., to Hornersville Junction, 5.9 miles, from which point the tracks of the Paragould Southeastern to Hornersville will be used, 1.5 miles. The company is carrying out the work with its own men. This year an extension was opened for traffic from Deering east to Caruthersville, 13.7 miles, and another extension was opened from Hickory Landing Road to Converse, 2.1 miles.

DENVER, NORTHWESTERN & PACIFIC.—According to press reports, this company will build a six-mile line from Utah Junction Col., to the Denver Union Stock Yards. It is understood that the contract has been let. The branch will cost about \$100,000.

EL PASO & SOUTHWESTERN.—Bids are wanted until September 15, for reconstructing 10 miles of line between Lewis Springs, Ariz., and Fairbank. The work calls for about 385,000 cu. yds. of grading, constructing 3,000 cu. yds. of concrete, and excavating for foundations about 3,000 cu. yds.

Subcontracts have been let by MacArthur Brothers Company for work on this line between Fairbanks, Ariz., and Tucson, 67 miles, as follows: Ely Construction Co., Springville, Utah, grading sections 34 to 38; Vosburgh & Carlson Concrete Co., Denver, Colo., sections 26 to 33 and 39 to 41, inclusive; Reiwitz Construction Co., Denver, sections 1 to 3, and to Crook, Allen & Co., Denver, from Tucson, Ariz., to a point four miles east of Vail. (Sept. 1, p. 453.)

ETOWAH VALLEY (Electric).—Application has been made for a charter in Georgia, to build from a point on the Louisville & Nashville, near Ballground, to Creighton, thence northeast to a point in the northern part of Towns county about 75 miles. The company is to have a capital of \$50,000, and is being promoted by: G. R. Glen, J. E. Tate, J. H. Moore, T. J. Smith, W. B. Townsend and C. R. Arnold, all of Dahlonega.

FLORIDA EAST COAST.—An officer writes that contracts have been let to the Kissimmee Valley Construction Company, Jacksonville, Fla., and work is under way building from Maytown, south to Lake Okeechobee, 130 miles, with a branch from this line at Whittier, south to Bassenger, 30 miles. Grading is finished on 40 miles and track has been laid on nine miles. The work involves handling about 9,000 cu. yds. a mile. Maximum grades will be .4 of 1 per cent., and maximum curvature 4 deg. There will be one 54-ft. bascule bridge; a 1,500-ft. trestle over the St. John's river, and a 900-ft. trestle over Econlockhatchee creek. The line is being built to carry fruit, vegetables, naval stores, timber products and cattle. (February 17, p. 335.)

GRAND TRUNK PACIFIC.—A contract for clearing 50 miles of the right-of-way from Aldermere, B. C., west on the Grand Trunk Pacific has been given by Foley, Welch & Stewart, it is said, to M. Sheady & Co., at \$50,000.

GULF LINE.—An officer writes that this company has finished work on extension from Bridgboro, Ga., southwest to Camilla, 20 miles, and it is expected that the line will be open for operation by October 1. John Lamb, Thomasville, was the contractor. No decision has as yet been made as to the route for an extension south from Camilla, to the Gulf of Mexico.

HIGHLAND PARK & LAKE BURIEN.—Bids are being asked for building from Seattle, Wash., to Lake Burien. Reitz, Storey & Duffy, are the engineers, Seattle.

KETTLE VALLEY LINES.—A contract has been given to L. M. Rice & Co., of Vancouver, B. C., and Seattle, Wash., it is said, for building a 40-mile section from Penticon, B. C., at the south end of Okanagan Lake, west to Ausprey Lake summit. (March 31, p. 814.)

LOUISIANA & ARKANSAS.—The line to Jena, La., is to be extended east to Vidalia, 48 miles. The extension has been surveyed and staked. A contract for grading has been let, and the Union Bridge & Construction Company, Kansas City, Mo., has delivered material for the construction of steel bridges over Little and Black rivers in Catahoula parish. The bridge over Little river is to be 400 ft. long, and the bridge over Black river 800 ft. long. It is thought that arrangements will be made with the Natchez & Southern to use that company's barges for transfer over the Mississippi river from Vidalia, to secure an entrance into Natchez, Miss. (February 10, p. 301.)

MARATHON COUNTY.—According to press reports, this road which now extends from Stratford, Wis., east about 20 miles, will be extended east nine miles towards Mosinee.

MISSOURI, KANSAS & TEXAS.—According to press reports, a contract has recently been given to Patton & Gibson for grading at the Ray yards, west of Denison, Texas. Ten additional tracks will be laid, each to hold 70 cars.

NAMPA & CALDWELL (Electric).—Contracts are to be let soon, it is said, to build from Caldwell, Idaho, southeast to Nampa, about 10 miles.

NEVADA ROADS (Electric).—A line is to be built from Carson City, Nev., it is said, southwest, to Glenbrook, on the east shore of Lake Tahoe, about 15 miles, and a line is also projected north to Reno. Donald Williams is interested.

OKLAHOMA NORTHWESTERN.—Incorporated in Oklahoma to build from Oklahoma City Northwest to Woodward, 150 miles. The incorporators include: E. A. Wagener, C. E. Close, J. J. Sullivan, W. H. Wood and E. F. Sparrow, all of Oklahoma City, representing the Classen interests, who own much of the street railway system of Oklahoma City.

PACIFIC COAST LINE.—Incorporated in Oregon with \$100,000 capital, to build from Portland, Ore., south to Humboldt Bay, in Humboldt county, Cal., about 360 miles. Branch lines are also to be built west of Tillamook Bay, Ore., and to Eugene Coos county. The incorporators include: T. V. Ward, T. J. Fording and George E. Frost, all of Portland.

PITTSBURGH & LAKE ERIE.—An officer writes that a grading contract has been let to the Robert Hill Construction Company, Fayette City, Pa., to build a line 4.5 miles long, from Downer's Run branch, over the divide to a connection with the Elwell Run branch, connecting the company's existing line at Whittsett Junction with the line at Fayette City.

QUINCY WESTERN (Electric).—Incorporated in Illinois with \$5,000 capital, and office at Quincy. The plans call for building from Niota, Hancock county, south through Hancock and Adams counties, to Quincy, about 50 miles. The incorporators include: W. T. Duker, H. F. Dayton, J. P. W. Wall, William S. Govert and S. B. Montgomery, all of Quincy.

SAN FRANCISCO, VALLEJO & NAPA VALLEY.—This company has made financial arrangements to build an extension from St. Helena, Cal., northwest to Calistoga, about 10 miles.

SHEARWOOD RAILWAY.—This company, which operates a freight line from Brooklet, Ga., to Davis, 6 miles, is planning to build an extension to a connection with the Seaboard Air Line at Claxton, about 15 miles.

WESTERN PACIFIC.—Plans are being made, it is said, to double-track this road from Oakland, Cal., northeast to Sacramento.

RAILWAY STRUCTURES.

BAYSHORE, N. Y.—Plans are being made for putting up a new passenger station on the Long Island at Bayshore. The structure is to be two stories high, 32 ft. x 64 ft., with brick walls and wood shingled peak roof. The cost of the improvements will be about \$15,000, and the work will probably be started in October. It is understood that residents of Bayshore will pay part of the cost of the new station.

DEL ROSA, CAL.—The Atchison, Topeka & Santa Fe Coast Lines has authorized the construction of a passenger station at Del Rosa.

DOUGLASSVILLE, PA.—The Pennsylvania Railroad has given a contract to the Eyre-Shoemaker Company, Philadelphia, for putting up an 11-span concrete bridge over the Schuylkill river near Douglassville. The cost of the work will be about \$90,000.

ELKHART, IND.—The Lake Shore & Michigan Southern has let the contract for building a brick and steel power house 116 ft. x 145 ft.

FORT WILLIAM, ONT.—An officer of the Canadian Pacific writes that a coal handling plant is being put up on Island No. 1 at Fort William, this is the only work under way at that place at the present time. The contract has been let to the Canadian Stuart Company, Chicago.

GALVESTON, TEX.—The Southern Pacific, it is said, will build a warehouse 71 ft. x 1,000 ft. to cost about \$100,000.

HERSHEY, PA.—An officer of the Philadelphia & Reading writes that a contract has been given to James McGraw & Co., for extension of culverts and constructing parallel retaining walls near Hershey.

KINGSTON, N. Y.—An agreement is said to have been reached between officers of the city of Kingston and of the Ulster & Delaware, and New York, Ontario & Western for the elimination of grade crossings on these lines in Kingston, at a cost of \$75,000, and a similar agreement has been made with the West Shore for grade crossing and elimination work in Kingston, to cost \$150,000.

MONTCLAIR, N. J.—Work is to be started at once by the Delaware, Lackawanna & Western on the terminal improvements at Montclair, also on the elimination of grade crossings at that place. The work includes putting up new freight and passenger stations, a viaduct, also an undergrade passageway and a foot bridge. (July 28, p. 200.)

OSKALOOSA, IOWA.—The Chicago, Burlington & Quincy has let the contract for building a one story brick passenger station, 32 ft. x 77 ft., with tile floors and hot water heat.

PEARSON, CHIHUAHUA, MEXICO.—The Mexico Northwestern, will build a new 16-stall roundhouse at Pearson.

RICHMOND, CAL.—The Atchison, Topeka & Santa Fe has let the contract for building an extension to its shops at Richmond. Construction will begin at once.

SAGINAW, MICH.—The Pere Marquette has let the contract for a one-story freight house, 460 ft. x 40 ft., with a transfer platform, 260 ft. x 12 ft., to cost approximately \$70,000. The building will be supported on concrete piles.

TRURO, N. S.—The time for receiving bids for the stone passenger station to be built at Truro for the Intercolonial Railway has been extended to September 15. L. K. Jones, secretary, Department of Railways and Canals, Ottawa. (August 18, p. 358.)

VALENTINE, TEX.—The Galveston, Harrisburg & San Antonio is said to be making plans for improvements to double the capacity of the roundhouse at Valentine.

WACO, TEX.—The city of Waco, under the terms of a compromise, has bought 100 acres of land for the Missouri, Kansas & Texas, on which the railway will build a passenger station, freight station, repair shops and a freight yard, with room for 3,000 cars.

YARDLEY, WASH.—The Northern Pacific, it is said, will build a car house and 48-stall roundhouse at this place.

Railway Financial News.

CANADIAN PACIFIC.—A provisional agreement has been entered into for the lease of the Quebec Central for 999 years. The rental is to be sufficient to pay interest and dividends on the \$3,382,000 stock and the \$6,233,000 income bonds and debenture stock. The main line of the Quebec Central is 143 miles long, running from Levis, opposite Quebec, to Sherbrooke, through an important asbestos district.

CHICAGO, MILWAUKEE & PUGET SOUND.—See Chicago, Milwaukee & St. Paul.

CHICAGO, MILWAUKEE & ST. PAUL.—The New York Stock Exchange has listed \$25,000,000 first mortgage guaranteed 4 per cent. bonds of 1949 of the Chicago, Milwaukee & Puget Sound. This block of bonds was sold several months ago, and is part of an authorized issue of \$200,000,000, of which \$147,802,000 is now outstanding. (June 2, p. 1298.)

DELAWARE & EASTERN.—The bondholders' committee, which bought this property under foreclosure, has asked the Public Service Commission, Second district, for approval of a proposed plan of re-organization. The plan provides for the organization of the Delaware & Northern, having an authorized capital stock of \$1,250,000, of which \$250,000 will be preferred stock with cumulative dividends at 6 per cent. Delaware & Eastern bondholders are to pay to the committee an amount equal to 25 per cent. of the par value of their respective holdings of bonds, the total amount of such subscription to equal, if all bondholders subscribe, the amount of the preferred stock.

DELAWARE & NORTHERN.—See Delaware & Eastern.

ILLINOIS SOUTHERN.—The present issue of \$4,600,000 first mortgage bonds is to be exchanged for \$1,380,000 new first mortgage bonds and \$1,380,000 income bonds on the basis of 3 per cent. of each issue of new bonds for existing ones. (September 1, p. 454.)

INTERBOROUGH RAPID TRANSIT.—This company has declared an extra dividend of 1 per cent. on its stock out of earnings for the past year, and a regular quarterly dividend of 2½ per cent., placing the stock on a 10 per cent. basis. Hitherto the regular quarterly dividend has been 2¼ per cent. These increased dividends will be used for the purpose of establishing a sinking fund for the \$67,000,000 Interborough-Metropolitan Company 4½ per cent. bonds.

MARSHALL & EAST TEXAS.—This company has filed a mortgage with the St. Louis Union Trust Company to secure an authorized issue of \$5,000,000 20-year 5 per cent. bonds. The company owns 90 miles of road from Elysian Fields, Tex., to East Winsboro. This issue was authorized last winter, but no bonds have as yet been issued.

NORFOLK & WESTERN.—This company has bought under foreclosure the Virginia Anthracite Coal & Railway Company, running from Christiansburg, Va., to Blacksburg, 10 miles. The purchase price was \$100,000. The road connects Blacksburg with the main line of the Norfolk & Western.

QUEBEC CENTRAL.—See Canadian Pacific.

VIRGINIA ANTHRACITE COAL & RAILWAY.—See Norfolk & Western.

The Interdepartmental Commission of Russia has approved in principle the formation of a company having the object of constructing branch lines serving existing state systems; branch lines afterwards to be worked by the state or company systems; and private branch lines. The company will have \$1,250,000 capital, and will have power to issue bonds guaranteed by the government. Branch lines linking up the state systems will belong to the company during a concessionary period of 81 years, following the first day of regular working, but will be worked by the state. Profits will be divided on prearranged terms. Government bonds will provide nine-tenths of the funds for the construction of these lines and the company will provide the other tenth.